SOIL SURVEY

of

KINGS COUNTY

Nova Scotia

D. B. Cann and J. I. MacDougall
CANADA DEPARTMENT OF AGRICULTURE
and
J. D. Hilchey
NOVA SCOTIA DEPARTMENT OF AGRICULTURE
AND MARKETING

Report No. 15

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A typical profile of an Orthic Podzol.

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INTRODUCTION

This report gives information obtained from soil survey of Kings County made during 1960-62. Part of the County had been surveyed previously (2).[1]

The factors that affect the development and use of the soils are discussed briefly before the main part of the report, which describes the soils in detail and their general suitability for agriculture. In a later section, the soils are grouped into capability classes according to the physical hazards that limit their use for agriculture. Also, the soils are rated for suitability for crops commonly grown in the area.

A soil map accompanying the report shows the locations of natural features, towns, roads and railroads and the distributions of the various soils. A descriptive legend on the map enables one to use the map without the report.

If you are interested in obtaining information about the soil in any part of the County, locate the area on the map and identify the soil by its color and symbol, given in the legend. You may get further information from the description of the soil and other parts of the report. The map and report, although compiled mainly for agricultural purposes, contain information useful to those interested in other phases of land use such as forestry, highway construction, conservation and recreation.

GENERAL DESCRIPTION OF THE AREA

Location and Extent

Kings County lies in the western mainland of Nova Scotia (Figure 1). It is bounded on the north by the Bay of Fundy, on the east by Minas Basin, on the south and southeast by Lunenburg and Hants counties and on the west by Annapolis County. The County includes part of the Annapolis-Cornwallis Valley, commonly known as the Annapolis Valley.

The County lies between 64°10′ and 65°00′ west longitude and 44°40′ and 45°20′ north latitude and has a land area of about 842 square miles, or 538,830 acres. The greatest distance from east to west is about 38 miles. The widest part, from north to south along the western boundary, is about 30 miles.

History and Development

The first settlement in Nova Scotia was established by the French at Port Royal, now Annapolis Royal, in 1605. For the next 150 years, the population of the Annapolis and Kings counties area was mainly French, who settled chiefly along the estuaries of the tidal rivers. In 1632 a settlement was established at Grand Pré and others soon after at Horton, Gaspereau and Cornwallis. The settlers built dykes along the Habitant, Canard, Cornwallis and Gaspereau rivers to keep out the tidal waters, and cultivated the fertile marshlands. They found the climate well suited to the production of fruit, vegetables and livestock. The earliest recorded planting of apple trees was at Annapolis in 1633. By 1755, there were small orchards of apple and pear trees on many farms.

[1]The number refers to a publication listed in "References" (page 00).

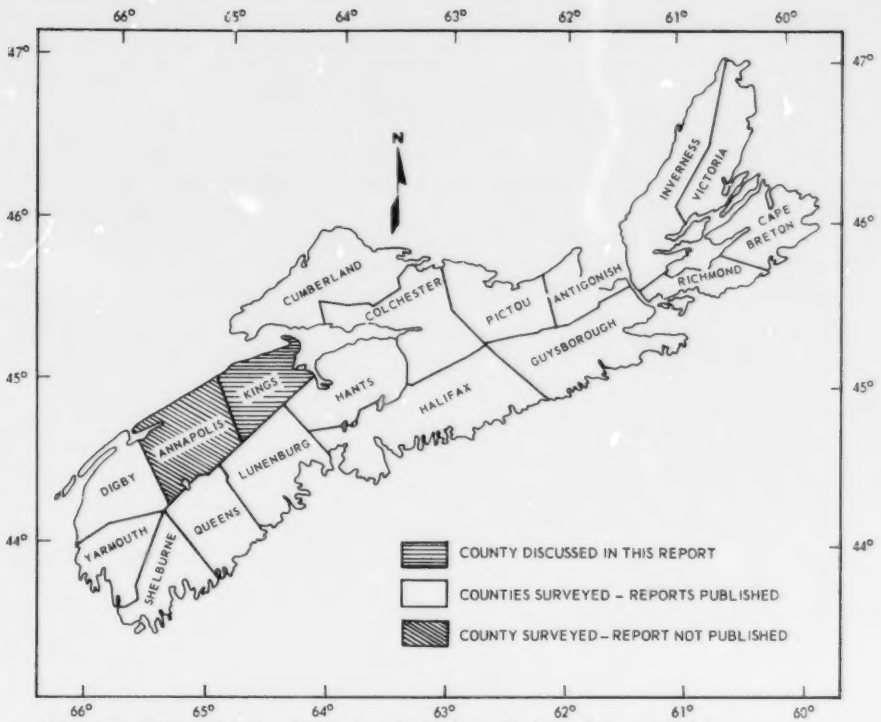

Figure 1—Areas of Nova Scotia in which the soils have been surveyed.

After Nova Scotia was ceded to Britain in 1713, the French settlers resented British rule and refused to take an oath of allegiance. Consequently, they were expelled from the province in 1755 and for about five years their lands lay idle. In 1758 Governor Lawrence invited settlers from New England to occupy the idle Acadian lands. In response, some 22 vessels bearing about 7,000 settlers arrived at Port Williams in 1760. These settlers noted the suitability of the climate for fruit growing and they planted more trees and developed some of the orchards begun by the French. There is, nevertheless, no direct connection between the orchards established by the French and the apple-growing industry as it developed to its peak at a later date. Between 1775 and 1783, large numbers of United Empire Loyalists settled in the area. Many of these were people of wealth and education and they did much to stimulate settlement and agricultural development.

The history and development of Kings County are closely associated with the development of the tree fruit industry, which is well described by Morse (8). The commercial production of apples had a slow start owing to lack of markets and efficient transportation. Agriculture, generally, lagged in the early years of the nineteenth century until the writings of Agricola (13), published in the *Acadian Recorder* from 1818 to 1820, stimulated the formation of agricultural societies and improved methods of farming. The first shipment of apples overseas was from Halifax to Liverpool in 1849, and about this time there was an increased demand for good fruit in Halifax. A railway from Windsor to Halifax was completed in 1858 and was extended to Annapolis in 1869. These events promoted expansion of apple production. In 1871 there were 2,916 acres under fruit trees in the County.

The expansion of apple growing was accompanied by development of towns and villages near the railway, where storage, packing and shipping facilities were available. The first warehouse was built at Port Williams in 1884, and by 1910 every station along the railway had one or more of these buildings. In 1910, also, an experimental station was established at Kentville to study the problems of the apple industry and of agriculture in the Annapolis Valley area.

The apple industry expanded most rapidly from 1911 to 1934, excepting a period of little progress during World War I. Processing plants were built to handle fruit that was not marketed fresh. Port facilities were developed at Port Williams in 1928-29, and use of cold storage and refrigerated ships resulted in better-quality apples getting to market. More cold-storage plants were built at Coldbrook in 1946 and 1948 and at Hillaton in 1947.

The growth of the apple industry was accompanied by development in other phases of agriculture. As the population increased, dairying became important and a market for fluid milk opened in Halifax. The marshlands were particularly suitable for raising hay and for grazing. More recently, many of the unprofitable apple varieties have been eliminated and there is a trend toward increased production of poultry, hogs, vegetables, small fruits and canning crops on areas formerly under orchard.

Population, Towns and Industries

The population of the County increased from 21,510 in 1871 to 41,747 in 1961 (Figure 2). It declined somewhat from 1881 until about 1911, rose gradually until 1931, and since then has risen rapidly. In 1961 about 72 percent of the population was classed as rural and the remainder as urban. About 25 percent of the rural dwellers were on farms.

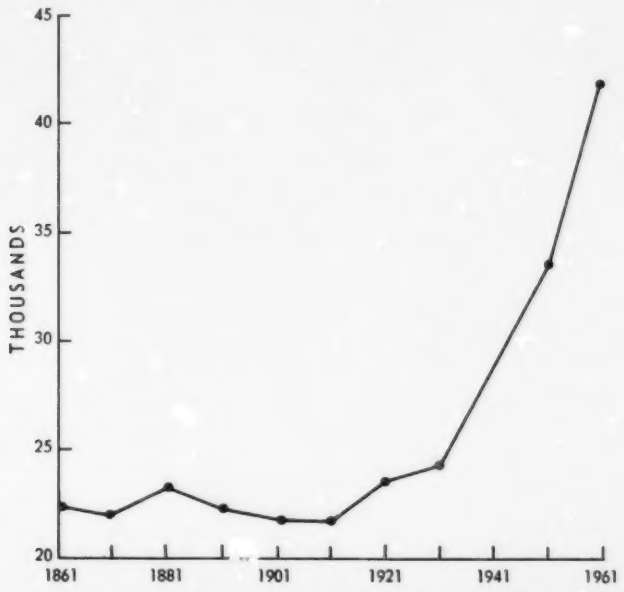

Figure 2—Population trends in Kings County, 1871-1961.

Kentville, with a population of 4,612 is the largest town in the County. Because of its favorable climate, it is the site of the Nova Scotia Sanatorium. Several industries are located in the town and vicinity. Among these are food processing plants, a bakery, a dairy, and factories producing mill machinery, gas engines, concrete products, lumber and wood products, elastic, and dusting machinery.

Wolfville (2,413) and Berwick (1,282) are the other incorporated towns in the County. Wolfville is the site of Acadia University. Berwick is one of the largest centers of apple production in the province. In addition to several large warehouses and fruit-packing plants, it has an abattoir, a bakery, a nursery, and also lumber mills and a supply house for irrigation equipment.

Waterville, Cambridge, Coldbrook, Kingston, Lakeville, Centreville and Sheffield Mills are thriving villages in orchard districts. Coldbrook has a large cold-storage and apple-packing plant and a fish hatchery. There is a nursery at Centreville, which is also the center of a potato-producing area. The extensive areas of fertile dykeland near Grand Pré promoted the development of dairy farming in this area. Port Williams is an important shipping point for apples and potatoes. There is also a large poultry industry near here. Canning is a center of fruit and vegetable growing and processing and has an axe factory. At nearby Hillaton there is a large apple cold-storage and packing plant and a quick-freezing plant. New Minas, near Kentville, has a large egg and poultry products cooperative and a plant for manufacturing potato chips. There are several cranberry bogs around Aylesford and Auburn. A large bog near Aylesford is used for commercial production of peat moss. A large Air Force training base is at Greenwood.

Along the coast of the Bay of Fundy are the fishing villages of Morden, Victoria Harbour, Halls Harbour, and Baxter Harbour. Scotts Bay is a potato-growing center.

Transportation and Markets

The Dominion Atlantic Railway from Yarmouth to Halifax passes through Kingston, Auburn, Aylesford, Berwick, Cambridge, Coldbrook, Kentville, Wolfville, Grand Pré and Avonport. A good network of roads in the County connects the villages and towns and provides good access to rail and water transportation.

A paved highway (No. 1) runs from west to east through the County, following the railroad closely (Figure 3). Another paved road (No. 12) connects Kentville with Chester Basin on the south shore of the province. Paved roads connect Kentville with Centreville, Port Williams, Canard, Canning and Kingsport and with Halls Harbour on the north coast of the County. Paved roads run between several villages on both the north and south sides of the No. 1 highway. Good gravel roads connect these with other parts of the County. Facilities for water transport are maintained at Port Williams and fairly large ships can be accommodated there.

The main agricultural products of the County are apples, potatoes, vegetables, poultry and poultry products, milk, cattle and hogs. Others are pears, peaches, plums, strawberries, blueberries, and by-products of the apple industry such as apple concentrate and juice, pickles and jam.

The market for apples is largely in Britain, but some are sold locally or processed in various forms. Halifax is a market for a considerable quantity of agricultural products from the area. Vegetables are shipped also to the Sydney market. The processing, canning and freezing plants in the County also provide a market for local produce.

Formerly, the County depended largely on the fortunes of the apple-growing industry for its economy. More recently, its agriculture has become more diversified. Vegetables and small fruits are becoming important crops. There has also been some industrial expansion and development.

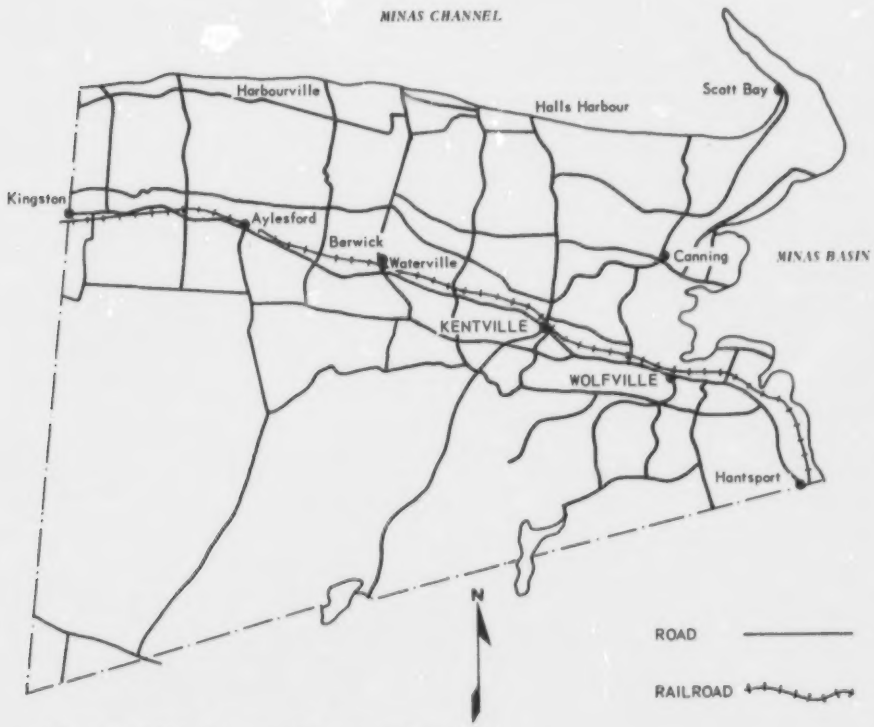

Figure 3—Principal towns and transportation routes.

FACTORS IN SOIL FORMATION

Climate

The climate is an important soil-forming factor. It supplies the energy necessary for and determines the rate of soil formation. The kind of native vegetation, kind and amount of organic matter added to the soil, and kind of crops that may be grown are governed by the climate. In Kings County the climate is very favorable for fruit growing.

Precipitation and temperature records give some idea of the kind of soil development that may be expected, the amount of leaching and the moisture available for plant growth. The effects of other variables, such as relative humidity, air pressure and prevailing winds, are not well known. Temperature and moisture conditions near the surface of the soil are different from those several feet above it, and the microclimate is the main factor in local variations in soil development.

Table 1.—Average Monthly and Seasonal Temperatures and Precipitation at Stations in Kings and Annapolis Counties[1]

	Kentville (30 years)		Wolfville (30 years)		Greenwood (10 years)		Springfield (30 years)	
	Temperature °F	Precipitation Inches	Temperature °F	Precipitation Inches	Temperature °F	Precipitation Inches	Temperature °F	Precipitation Inches
December	26.0	4.11 (18.9)[2]	26.9	4.24 (19.7)	26.9	4.46[3]	27.5	5.82 (17.5)
January	21.2	4.01 (18.8)	22.6	4.23 (21.4)	21.9	4.33	23.6	5.27 (22.6)
February	20.3	3.31 (20.2)	22.0	3.28 (20.6)	20.8	4.22	21.7	4.42 (19.6)
Winter	22.5	11.43 (57.9)	23.8	11.75 (61.7)	23.2	13.01	24.2	15.51 (59.7)
March	29.3	3.33 (13.8)	30.4	3.34 (14.1)	30.5	2.87	29.7	4.55 (13.2)
April	39.6	2.78 (5.3)	40.0	2.95 (5.1)	39.8	2.98	39.3	4.28 (7.4)
May	50.8	2.99 (0.4)	51.0	2.80 (0.4)	51.1	3.34	50.9	3.71 (0.4)
Spring	39.9	9.10 (19.5)	40.4	9.09 (19.6)	40.4	9.19	39.9	12.54 (21.0)
June	59.9	2.98	59.8	2.87	60.3	2.98	60.0	3.78
July	66.6	2.91	66.6	2.80	66.7	2.51	66.0	4.12
August	65.1	3.42	65.3	3.17	64.6	3.09	64.6	4.11
Summer	63.8	9.31	63.9	8.84	63.8	8.58	63.5	12.01
September	57.8	3.53	58.6	3.45	57.2	2.74	57.3	4.28
October	48.0	3.91	49.0	3.74 (0.2)	47.4	2.76	48.2	4.74 (0.3)
November	38.0	4.12 (5.6)	38.8	4.12 (5.2)	38.0	4.89	38.4	5.17 (4.2)
Fall	47.9	11.56 (5.6)	48.8	11.31 (5.4)	47.5	10.39	47.9	14.19 (4.5)
Year	43.6	41.40 (83.0)	44.3	40.99 (86.7)	43.8	41.17 (90.9)	43.9	54.25 (85.2)

[1]From reports of the Meteorological Branch, Air Services, Canada Department of Transport, Ottawa.
[2]Snowfall (10 inches of snow = 1 inch of rain).
[3]Snowfall not recorded.

The precipitation and temperature records in Table 1 indicate the general range of the climate in the County, but there are many local variations. The Kentville and Wolfville stations, near one another, indicate the climate of the eastern end of the Annapolis Valley. Greenwood is near the center of the Valley, on the western edge of the surveyed area. The Springfield station, in southern Annapolis County, indicates the climatic conditions on the South Mountain upland.

The mean annual temperature is practically the same at all the stations. Winter temperatures are slightly lower at Kentville, but the summer temperatures differ little. The Greenwood, Kentville and Wolfville stations have similar patterns and amounts of precipitation during the year, but the Springfield station has considerably more precipitation at all seasons. In general, the mean monthly temperature rises fairly rapidly and the mean monthly precipitation increases slightly from March until July or August. Then, precipitation increases and the temperature drops rather rapidly until December, and both decrease from then until February.

In the apple-growing area, gales often do considerable damage to the crop. The center and south sides of the Valley are especially susceptible to gales from the northeast. During the summer about 3 percent of the winds are from the northeast, but in the fall these winds increase markedly in frequency, becoming about 25 percent in the winter.

The average frost-free period (Table 2) ranges from 114 days at Greenwood to 149 at Wolfville. The difference in frost-free period between the Kentville and Wolfville stations is noteworthy. This indicates the amount of local variation that may be expected.

For the Kentville station, the total degree-days above 42°F to September 30 was 2,591 in 1961 and 2,489 in 1962. The figures for the Greenwood station were 2,797 and 2,535.

The amount of moisture available to plants may be determined, in general, from records for precipitation and mean temperature (12). As a rule, the average loamy soil can store four inches of rainfall. If rainfall exceeds evaporation, as it usually does in the fall, winter and spring, a surplus results. In the summer, however, evaporation may exceed rainfall so that the moisture in the soil is less than that needed by plants.

Table 2.—Average Dates of Last and First Frosts and Numbers of Frost-free Days at Several Stations Representative of the County

Station	Elevation Feet	Average dates of frosts	Frost-free period, days		
			Average	Longest	Shortest
Greenwood	80	May 27, Sept. 18	114	126	106
Kentville	40	May 23, Sept. 25	125	150	102
Wolfville	135	May 15, Oct. 11	149	181	105
Springfield	549	May 15, Oct. 2	140	162	120
Windsor	90	May 22, Oct. 3	134	166	87

Kentville usually has a deficiency of ⅓ to ½ inch in August, but this ends early in September. Wolfville, only seven miles away, has a deficiency of ½ inch beginning early in August and ending in early September. Greenwood has a deficiency in both August and September. There is no summer deficiency at Springfield, although the stored water is drawn down to about half of its normal value. However, the very sandy soils found in large areas of the County can store only about 1 to 2 inches of rainfall, rather than 4 inches. These soils have severe moisture deficiencies during any extended dry period during the growing season.

The moisture available to plants varies markedly between seasons from year to year. A dry spring may draw on stored water early in the season and cause a deficiency in late June or early July. In 1962, a dry year, the deficiency in some soils was probably four times as much as in 1961, a wet year. If much stored water is used in May, there will almost certainly be deficiencies in July and August, regardless of a wet summer. The 7-year average for May to September shows that weekly rainfall at Kentville, Wolfville and Greenwood was less than one inch 73 percent of the time. At Springfield the corresponding percentage was 63.

Though there is variation in the seasonal moisture available to plants, the total moisture available is about the same from year to year.

Parent Materials

The rocks and surface deposits (Figure 4, Table 3) that provided the parent materials of the soils in the surveyed area have been studied by a number of workers (2-9, 11). The underlying rocks include volcanic, sedimentary and metamorphic formations of wide range in age.

Table 3.—Geological Formations in the County[1]

Era	Period	Formation	Kind of material
		Recent	Peat, river deposits, diatomaceous earth, etc.
Cenozoic	Quaternary	Pleistocene	Ground moraine, kames, eskers, etc.
Mesozoic	Triassic	Scott Bay	Interbedded gray, green and brown sandstone; gray, purple and green shale; white and gray limestone
		North Mountain basalt	Massive and amygdaloidal basalt
		Annapolis	
		Blomidon shale	Red, gray-green, gray claystone; siltstone and fine-grained sandstone
		Wolfville sandstone	Interbedded red, purple, gray and green shale; siltstone; medium to coarse sandstone; conglomerate
	Carboniferous	Mississippian	Sandstone, shale, conglomerate
Paleozoic	Devonian	South Mountain batholith	Porphyritic granite; granite; basic dykes
	Silurian	New Canaan	Marine breccia, slate, limestone
		Kentville	Slate, siltstone
		White Rock	Slate, quartzite
	Ordovician (?)	Halifax	Slate, quartzite
	Cambrian (?)	Goldenville	Quartzite, slate

[1]Compiled from information from Department of Geology, Acadia University, N.S. See "References."

The Scotts Bay formation, the youngest rock in the area, overlies the North Mountain basalt. These sandstones are cemented with chloritic clay mixed with calcite, quartz and agate. The North Mountain basalt is composed chiefly of basic plagioclase, augite, hornblende and magnetite. Secondary minerals include chlorite, uralite and several zeolites. The top flows of the amygdaloidal trap may contain as much as 20 percent iron oxides.

In the Annapolis formation, the conglomerates consist of materials derived from the adjacent country rock cemented by calcite or hematite. Hematitic clays coat the grains of the sandstones. Magnetite, muscovite, biotite and chlorite are also present in small quantities. In the siltstones and clay stones, X-ray diffraction studies show that illite is the main clay mineral, with some chlorite and traces of kaolinite, montmorillonite. Calcite, feldspar and quartz are present also.

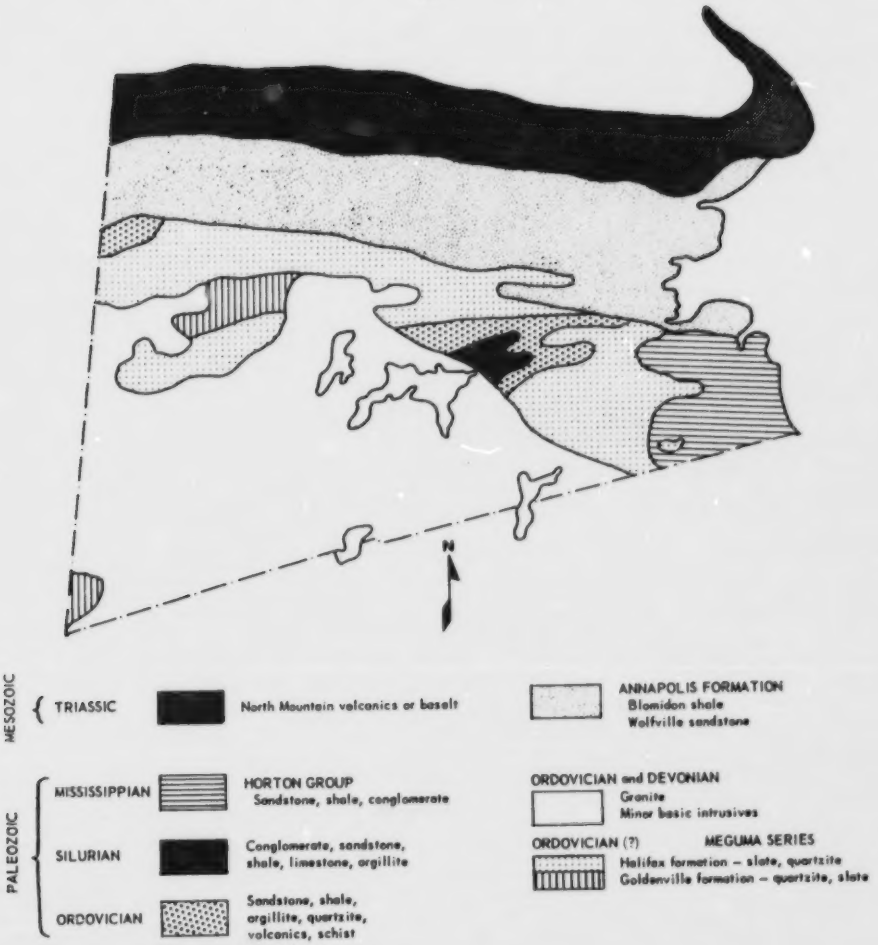

Figure 4—Geological formations.

The Carboniferous sandstones and shales are composed largely of quartz, with some pink orthoclase and minor amounts of chlorite, muscovite and biotite. The pre-Carboniferous rocks that occupy the slopes and crest of the South Mountain are mainly quartz with varying amounts of chlorite, hematite, sericite, muscovite and magnetite. The southwestern corner of the County is underlain by a granite batholith.

The continental ice sheet moved over the County from the northeast and its weight lowered the land surface at least 100 feet below its present level. The floor of the Annapolis Valley was covered with water and connected with the sea at both ends. As the ice melted, much material was deposited in the valleys and the sea level rose. As the land and sea levels changed, benches and beaches were cut in the bedrock and glacial debris. Later, local glaciers formed on the South Mountain and moved northward, reworking and redepositing the sediments on the valley floor and on the southern slope of the North Mountain. Because of this extensive reworking of the sediments, the parent materials range widely in texture and kind of rocks.

The surface deposits in the County may be divided into three groups: (1) ground moraine, (2) outwash, kames, eskers and deltas and (3) glaciolacustrine clays. The various textures of the parent materials are shown in Figure 5.

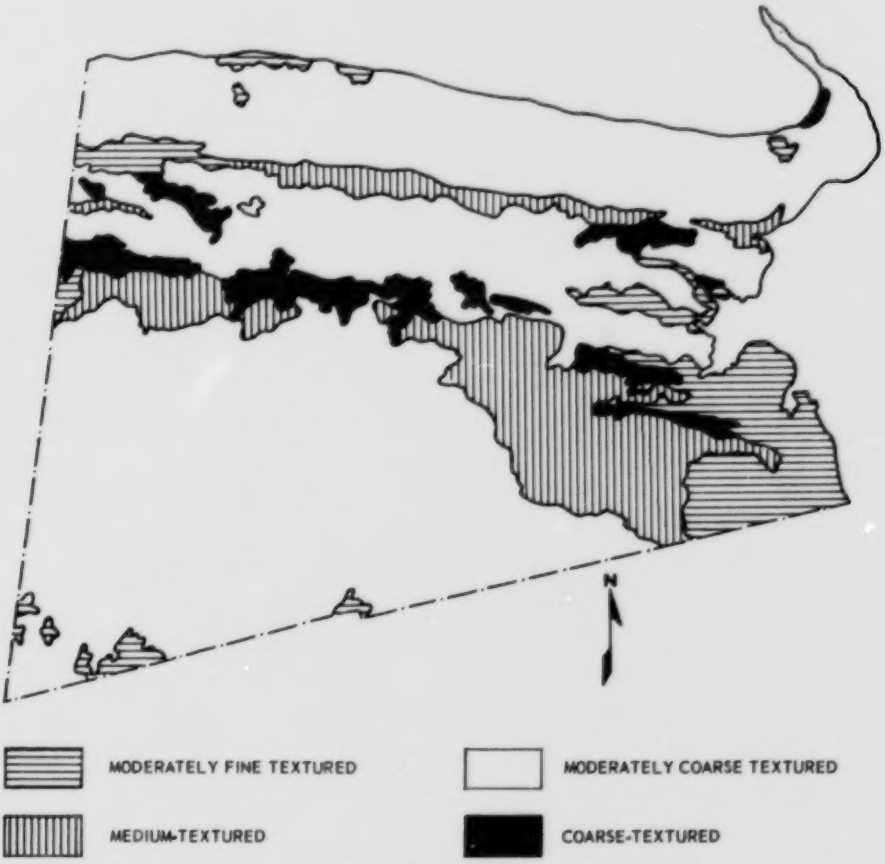

Figure 5—Textures of the parent materials of the soils.

The ground moraine consists chiefly of glacial till ranging in texture from sandy loam to sandy clay loam. On the North Mountain the deposits are not very thick, less than an average of four feet on the summit. Thicker deposits occur on the south slope of the mountain and along the coastline, where they are up to 50 feet thick. The material is composed of debris from New Brunswick, the Cobequid Mountains, locally weathered debris and, in some places, material from the South Mountain. It is generally coarse-textured, reddish brown and moderately stony. Where basaltic material predominates it imparts a grayish-brown color to the material. Scattered deposits of ground moraine occur on the Valley floor. The material is very sandy and rather thin over the bedrock. In the area to the north and east of Kingsport, the ground moraine is thicker and somewhat finer in texture. Fairly thick deposits of till cover the slopes of the South Mountain, the Gaspereau

Valley and drumlin-like hills around Avonport and Hantsport. The till here is a reddish-brown sandy loam to sandy clay loam that contains a considerable amount of material from the South Mountain. It is not so readily permeable as the material to the north, but generally has good surface drainage. In some places drumlins have been formed. On the summit of the South Mountain the ground moraine is thin. Towards the southern part of the County the material loses its reddish color and becomes grayish brown to olive, moderately coarse and usually very stony.

The outwash, kames, eskers and deltas occupy a large part of the Valley sides and floors. These deposits have been extensively reworked by water. They range in texture from very coarse gravels to very fine loamy sands. On the north side of the Valley the deposits are usually reddish and fine in texture and contain materials washed from the North Mountain and the underlying Blomidon shales. On the south side of the Valley the deposits are coarser and more yellowish brown and contain considerable debris from the South Mountain. These deposits vary considerably in the degree of sorting and stratification. Kame terraces and deltaic deposits are found on the sides of the valleys. In general, these deposits have rapid to excessive drainage and vary markedly in texture from layer to layer.

The glaciolacustrine materials are not very extensive. Generally, they consist of reddish, very fine sands or clays of variable thickness laid down in ponded glacial lakes. They are underlain by coarse sand or varves of sand and clay.

Recent deposits of sandy alluvium occur along the channels of the larger streams in the area. These are grayish or reddish sediments ranging in texture from sandy loam to silt loam. Generally, they overlie gravel at depths of two to five feet Thick deposits of reddish silts and clays have been laid down by tidal waters along the estuaries of rivers. Drainage in these materials is moderately slow.

Several peat bogs occur in the County. They consist of sphagnum peat and moss accumulated in former lake beds.

Vegetation

Vegetation has considerable effect on soil formation and development. Decaying vegetation adds organic matter to the soil, and the composition of this material affects biological activity and other soil-formation processes. Organic residues from coniferous trees form an acid type of humus on the surface and later leaching by rainfall readily removes bases, leaving the soil sour. Deciduous trees, on the other hand, contribute small amounts of bases to the surface in their leaf litter, forming a less acid type of humus and a different biological environment. The conditions on the surface may also determine the kind of succeeding vegetation in the area. All this affects the kind of soil formed and the rate of its development.

Slightly more than 58 percent of the County is covered with productive forest. About 52 percent of the forested land consists of softwood, 47 percent of mixed hardwoods and softwoods and less than 1 percent of hardwoods. Red spruce (*Picea rubra*) and white pine (*Pinus strobus*) are the main softwood species, followed by white spruce (*Picea glauca*), balsam fir (*Abies balsamea*) and hemlock (*Tsuga canadensis*). Minor amounts of red pine (*Pinus resinosa*), black spruce (*Picea mariana*) and tamarack (*Larix laricina*) also occur. The most common hardwood species are red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula lutea*) and white birch (*Betula papyrifera*), with minor amounts of beech (*Fagus grandifolia*), white elm (*Ulmus americana*), white ash (*Fraxinus americana*), black ash (*Fraxinus nigra*), aspen (*Populus tremuloides*), poplar (*Populus balsamifera*) and wire birch (*Betula populifolia*).

According to Roland (10) the slopes of the North and South mountains were originally covered with hardwood, mainly sugar maple. Beech occurred in nearly pure stands on the drier slopes. At present, these trees are associated with yellow birch, white birch, red oak (*Quercus borealis*) and ash. In the ravines and on the finer-textured soils, hemlock, white spruce and balsam fir are common on the better-drained sites. At one time hemlock formed about half the annual cut in the western part of the County. Imperfectly drained soils support a growth of red spruce, red maple and poplar. Black spruce, red maple and tamarack are found in the poorly drained areas.

On the well and excessively drained sands and some sandy loams in the center of the Valley, red pine is the main species, with some white pine and wire birch. Where severe cutting or fires have destroyed the humus, a heath-like vegetation develops consisting of sweetfern (*Comptonia peregrina*), broom crowberry (*Corema conradii*), bearberry (*Arctostaphylos uva-ursi*), blueberry (*Vaccinium*) and bracken (*Pteridium aquilinum*).

When cultivated fields are abandoned, the grasses give way to weeds and eventually to crowberry, sweetfern, blueberry and bracken. Wire birch is the first bush to invade these areas. In the moister areas, poplar may also come in. The birch later shades out the crowberry and allows pine seedlings to become established. These in turn overgrow the birch and kill it. Poplar does not die out like the birch, and if the pines are cut the poplar may form dense stands.

The peat bogs are covered with sphagnum moss, labrador tea (*Ledum groenlandicum*), sheep laurel (*Kalmia angustifolia*), cotton grass and pitcher plant (*Sarracenia purpurea*). The salt-marsh areas along the estuaries support a growth of marsh grass (*Spartina pectinata*), glasswort (*Salicornia europaea*), sea blite (*Cakile edentula*) and sand spurrey (*Spergularia marina*).

Topography and Drainage

Topography and drainage have local effects on soil development and cause differences in soils from the same kind of parent material. Topography and the parent material determine the amount of water that percolates through the soil. If the land is flat or depressional the surface water cannot run off readily and the soil may remain saturated for long periods, particularly if the parent material also is impermeable. On the other hand, water may percolate rapidly through a very porous soil so that there is very little runoff even on steep slopes.

The main topographic feature of the County (Figure 6) is the broad trough that forms the eastern end of the Annapolis Valley. It lies between the steep escarpment of the North Mountain, which protects it from the Bay of Fundy on the north, and the slopes of the South Mountain on the south. It is 5 to 7 miles wide, being widest at its eastern end where it merges with the lowlands surrounding Minas Basin. The elevation of the Valley floor ranges from a few feet above sea level along the tidal estuaries to 200 feet near Kentville and Somerset. The height of land near Somerset separates the area draining westward into Annapolis Basin from that draining eastward into Minas Basin.

The eastern end of the Valley is divided into three sections by rivers. Between Pereau Creek, which flows along the base of the North Mountain, and Habitant Creek is an undulating to gently rolling area reaching an elevation of 125 feet and terminating in abrupt sea cliffs along the Minas Basin shore. The area between the Habitant and Canard rivers, farther south, is broad and gently undulating, and

ranges from 20 to 100 feet in elevation. Between the Canard River and the Cornwallis, which borders the South Mountain, the land reaches an elevation of 200 feet and is more rolling than the other two areas.

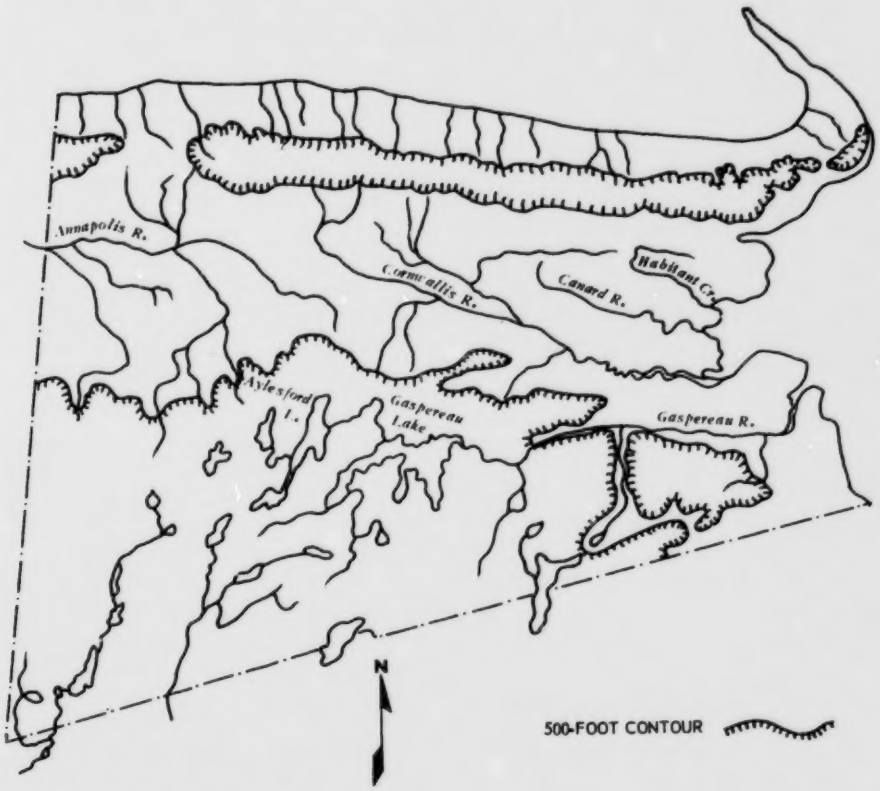

Figure 6—Main heights of land and rivers.

From Kentville west, the center of the Valley is a gently undulating plain formed by water-deposited materials. The surface becomes more undulating to rolling along the borders of the mountain slopes. Near Wolfville a spur of the South Mountain, locally known as the Ridge, separates the Gaspereau Valley from the Annapolis Valley. The Gaspereau is a steep-walled, level-bottomed valley about two miles wide at its eastern end. It narrows to about one mile south of Wolfville and eventually becomes a ravine near White Rock.

The North Mountain is 5 to 7 miles wide. It rises sharply from the Valley floor to a height of 700 feet and then slopes gently to the Bay of Fundy. On its summit it appears to be level, but is composed of a number of low ridges. Along the coastline a number of projecting points and small coves offer shelter for fishermen.

The South Mountain and its spur also rise sharply from the Valley floor, to about the same elevation as the North Mountain. These uplands form part of the former Atlantic peneplain. The crest of the spur is undulating and dips toward the northeast to sink below sea level near Horton Bluffs. On the eastern end of the spur, rolling hills occur in the area around Hantsport and Avonport. The South Mountain proper dips gently toward the southeast and forms part of the southern upland of the province. The surface consists of many low, rounded hills and numerous lakes and peat bogs.

Various rivers and small streams provide the County with adequate drainage. The rivers already mentioned — Cornwallis, Annapolis, Gaspereau, Habitant, Canard and Pereau — drain the valley floors. They are fed by streams flowing from the North and the South Mountain areas. Numerous lakes and small streams occur on the uplands. Some of the larger ones, such as Black River Lake and Gaspereau Lake, are used as sources of power development.

Although there are adequate outlets to carry off the surplus water, many of the soils are imperfectly to poorly drained because the parent material or topography restricts water movement. Seepage spots occur on the slopes, particularly on South Mountain. Dykes and aboideaux are used as aids in draining the tidal deposits.

Time

The time required for a soil to develop distinct horizons depends on the interaction of the soil-forming factors. Formation of the soils in the County began with the melting of the glacial ice some 10,000 years ago. There have been marked changes in the climate and vegetation during this time. In general, the horizons of the solum are most distinct where the parent materials had good drainage and aeration. Some parent materials, such as those recently deposited by streams or tidal waters, have not been influenced by the soil-forming factors long enough to develop distinct horizons in the solum, except possibly a surface horizon.

SOIL DEVELOPMENT AND CLASSIFICATION

The cool, humid climate of the region, interacting with the other soil-forming factors over long periods of time, has produced changes in the soil mantle that can be observed in a vertical section, or *soil profile*. The additions, losses, transformations and translocations that occur have caused the formation of layers, or *horizons*, that differ from one another in thickness, texture, structure or consistence. The horizons are named A, B and C[2] from the surface downward, and each may be subdivided on the basis of differences in observable characteristics. It is on the basis of the features of the horizons that the soils are classified. The main characteristics used are the number of horizons, their sequence, thickness, color, texture, structure, consistence and mineral and chemical compositions.

Each soil does not have sharp boundaries, but grades along its margins into others of unlike properties. Also, as a soil has depth as well as area, the features of each horizon may vary both laterally and vertically. It is therefore necessary to choose arbitrarily the range in features for each soil named.

Under given climatic conditions over a fairly broad area, many soils on materials that have good drainage and aeration develop a few characteristics in

[2]See the glossary for definitions.

common. In Kings County most of the well-drained soils are members of the Podzol great group. The profile of a typical virgin Podzol (Frontispiece) in the County is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	1 – 0	Very dark grayish brown (10YR 3/2)[3] needles and leaf litter; poorly decomposed.
Ae	0 – 6	Pinkish-gray (7.5YR 7/2) sandy loam; loose; friable; medium granular structure.
Bfh	6 – 20	Yellowish-red (5YR 4/6) coarse sandy loam; granular structure; moderately firm.
Bf	20 – 40	Dark-red (2.5YR 3/6) sandy loam; granular structure; firm.
C	40+	Dark-red (2.5YR 3/6) gravelly sandy loam; very firm; porous.

In some of the well-drained soils of the County, organic matter has accumulated in the upper part of the B horizon. This imparts a dark color to the horizon and is common in soils on North Mountain. These soils belong to the Humic Podzol group.

Wherever drainage is restricted by the topography or the parent material, the soils remain moist for considerable periods. Then the horizons are not so distinct as in the well-drained soils and have duller colors. Where drainage is only moderately slow, the horizons are usually distinct, but have yellowish-brown, reddish-brown or gray mottles that become more prominent as drainage becomes poorer. The soils that have the characteristic horizons of Podzols but are mottled are called Gleyed Podzols.

When water remains in the soil for a large part of the year, the horizons become less distinct, have colors of low chroma and are prominently mottled. These soils are classed as Gleysols. The profile of a typical virgin Gleysol is as follows:

Horizon	*Depth Inches*	*Description*
L – H	6 – 0	Black, semidecomposed organic matter under 3 inches of moss; fibrous mor.
Aeg	0 – 4	Dark grayish brown (10YR 4/2) coarse sandy loam; medium granular structure; mottled.
Bg1	4 – 12	Very dark grayish brown (10YR 3/2) sandy loam; medium granular structure; moderately firm; prominently mottled with gray patches.
Bg2	12 – 24	Yellowish-brown (10YR 5/6) sandy loam; firm; prominent strong-brown and gray mottles.
Cg	24+	Light brownish gray (2.5Y 6/2) coarse sandy loam; very firm; distinct mottling.

Along the streams and in the tidal estuaries throughout the County, the sediments have not been in place long enough to develop sola, except possibly a surface horizon. These soils are called Regosols.

[3]Munsell notation; see the glossary.

There are numerous depressional areas in the County that are saturated with water for much of the year and in which much organic material has accumulated. Some of these areas are sites of former lakes. These organic soils do not have the distinct horizons found in the mineral soils, but rather a succession of layers composed of moss and sedges in various stages of decomposition. If decomposition is well advanced the surface layer may be a muck, but usually the material is only slightly decomposed and is classed as peat.

How the Soils Were Mapped

Differences in texture, color, consistence or parent materials were used to separate the soils into *soil series*, the mapping units. The boundaries between the series were determined by examination of soil profiles in many locations.

Profiles were examined near all roads and trails, in pits dug in fields and forested areas, and in road exposures.

The boundaries between the various series were plotted on aerial photographs on a scale of four inches to one mile. Differences in stoniness and slope were recorded for each series and notes were taken on the vegetation, crops, agricultural practices and suitability for uses of the various soils. Samples were taken of the most important soils for physical and chemical analyses (Table 16).

Classification of the Soils

Each of the great soil groups has a distinctive kind of profile. There are local variations in the texture, color or consistence of the horizons, usually associated with differences in the parent material. For this reason it is convenient to divide the great groups into subgroups based on some characteristic such as the kind of development of the B horizon. The subgroups are subdivided into *series*. The soils in each series have developed from the same kind of parent material and have the same drainage and horizon characteristics except for the texture of the surface layer.

The soil series in the County are arranged in Table 4 to show their principal relationships. The main differences in the soils are associated with differences in the texture and composition of the parent materials. The soils in each horizontal

Table 4.—A Classification of the Soils of Kings County

Parent material	Soil Drainage Class				
	Rapid	Good	Moderate	Imperfect	Poor
Humic Podzol and Gleysol Great Groups		*Orthic Humic Podzol*		*Gleyed Orthic Humic Podzol*	*Orthic Gleysol*
Dark yellowish brown sandy loam till		Rossway		Roxville	Tiddville
Podzol and Gleysol Great Groups		*Orthic Podzol*		*Gleyed Orthic Podzol*	
Reddish-brown sandy clay loam till			Wolfville	Hantsport	Mahone
Olive-gray to olive-brown loam till		Rawdon		Riverport	Middlewood
Reddish-brown sandy loam to loam till		Morristown			
Dark-red loam till		Pelton			
Dark-red sandy loam till		Woodville		Debert	Masstown
Dark-red sandy loam till		Berwick	Kentville		
Red sandy loam to loamy sand till		Somerset		Debert	Masstown
Dark-red sand over reddish brown clay		Avonport			
Dark reddish brown sandy loam till		Glenmont			

Parent material	Soil Drainage Class				
	Rapid	Good	Moderate	Imperfect	Poor
Reddish-brown sandy loam till		Bridgetown		Annapolis	
Grayish-brown stony sandy loam till		Halifax		Danesville	Aspotogan
Reddish-brown fine sand outwash	Cornwallis			Kingsport	Millar
Red loamy fine sand outwash	Canning			Kingsport	Millar
Brown gravelly loamy sand outwash	Torbrook				
Grayish-brown gravelly sandy loam outwash	Gulliver				
	Textural Podzols				*Eluviated Gleysols*
Dark reddish brown clay loam till			Middleton		Lawrence-town
			Fash		Lawrence-town
				Gleyed Ortstein Podzol	*Orthic Gleysol*
		Ortstein Podzols			
Pale-brown coarse sandy loam till		Gibraltar		Bayswater	Aspotogan
Yellowish-brown coarse sand and gravel	Nictaux				
				Gleyed Orthic Regosols	*Rego Gleysols*
Regosol and Gleysol Great Groups		*Orthic Regosols*			
Reddish-brown silt loam alluvium		Stewiacke			
Reddish-brown fine sandy loam alluvium		Cumberland		Bridgeville	Chaswood
Reddish-gray to reddish brown silty clay loam alluvium					Acadia
Organic Soils					*Organic Soils*
Semi decomposed organic materials					Peat

row of Table 4 have developed from the same kind of parent materials but differ in drainage. As drainage becomes poorer, organic matter in the surface layer increases, the soils become mottled and the horizons less distinct from one another. Within any subgroup, the soils in any vertical column with parent materials of similar texture have similar physical features and usually similar management requirements. Such soils are grouped into families. There may be several families in one textural class if some soils have different use and management requirements than others.

DESCRIPTIONS OF THE SOILS

This section gives information on the classification, locations, surface features, profiles and agricultural uses of the soils. Table 18 gives the acreage of each topographic and stoniness phase for each soil, and the acres of cleared land in each phase. The soils are rated for agriculture on page 176. For photographs of representative profiles, see Figures 9, 10, 13, 14 and 16.

The various soil series are described in detail.[4] Because of the scale of mapping, any area outlined on the map as a soil series may include up to 15 percent of the soils of adjacent series. Usually the pockets of soil not shown are small. The profile described for each series is a cross section through one soil of the series at one point. Hence it cannot show the range in characteristics of the series as a whole. An average profile, however, was selected. The range of characteristics is discussed in the text.

[4]In the descriptions, the soil colors are as in the Munsell soil color charts (Munsell Color Company Inc., Baltimore 2, Maryland, U.S.A. 1954).

The soils developed from glacial till occupy about 80 percent of the land area of the County. About 90 percent of these soils are well drained, 8 percent imperfectly drained and the rest poorly drained. The other mineral soils have developed from glaciofluvial materials (11 percent), recent alluvium (3 percent) and lacustrine deposits (0.5 percent). Peat, salt marsh, rocky land and coastal beach occupy the rest of the land area. Most of the soils developed from glaciofluvial materials are well drained, but most of the alluvial and lacustrine soils have poor drainage.

Soils Developed from Fine-Textured Parent Materials

These soils occupy about 9 percent of the land area of the County. The moderately well drained series, Wolfville, Middleton and Fash, comprise about 40 percent of this area; the imperfectly drained series, Hantsport, about 36 percent; and the poorly drained series, Mahone, Lawrencetown and Acadia, the rest. Nearly half of the area of these soils is cleared.

Wolfville Series (16,178 acres)

The Wolfville soils occupy 3 percent of the land area of the County. The largest areas occur on the slopes of the South Mountain between Wolfville and Hortonville. Smaller areas are found along the southeastern boundary of the County east of Lake Tremont, around Hantsport and South Tremont and along the coast between Harbourville and Victoria Harbour.

These soils have developed to a depth of about 26-30 inches from a moderately deep, dark reddish brown sandy clay loam till. They are found on drumlins and on undulating to rolling or steeply sloping topography, the slopes ranging from 3 to 15 percent. The surface drainage is adequate, but faint mottling in the subsoil indicates that water moves through the soil rather slowly. However, the soils are moderately well drained. In the poorer drained positions, the soils are associated with the Hantsport and Mahone series. Surface stones range from few to many, about 30 percent of the soils being very stony.

Where the soils are forested the main trees are spruce, hemlock, balsam fir, maple, poplar, wire birch and white oak. The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 8	Dark reddish brown (5YR 3/3) loam; fine granular structure; friable; numerous roots; pH 5.2.
Bfh1	8 – 16	Yellowish-red (5YR 4/6) sandy loam; moderately firm; breaking into small platelike fragments; granular; small roots; slate fragments; very faint mottling; pH 5.3.
Bfh2	16 – 24	Dark reddish brown (2.5YR 3/4) loam; moderately firm; coarse, subangular blocky structure; some gray coatings on cleavage faces; faint mottling; pH 5.4.
C	24+	Dark reddish brown (2.5YR 3/4) loam; firm; massive, but subangular blocky structure when removed; some large stones; pH 5.8.

Under forest, these soils have a thin layer of organic matter on the surface underlain by 1 to 3 inches of pinkish-gray sandy loam. On cultivation, these layers are mixed with the upper B horizon. The surface layers under forest are more acid than the cultivated layer, the pH ranging from 3.8 to 4.2.

The soils are usually redder in Kings County than in other areas of the province, and the till may be somewhat coarser textured, ranging from loam to sandy clay loam. The texture of the surface layer ranges from sandy loam to mainly loam. Small areas of soils west of Hantsport town and near Avonport that are coarser-textured at a depth of 10 to 18 inches were included with the Wolfville series.

The yellowish-red B horizon is often thicker than that described above. Faint to distinct mottling occurs in the lower B and C horizons. In the Annapolis Valley area, the parent materials of the Wolfville and other fine-textured soils have a higher content of exchangeable bases than is usually found elsewhere in the province.

Use

Slightly more than half of the Wolfville soils are suitable for agriculture and most of them are being farmed. The remainder is very stony or steep land that should remain in forest. The main crops grown are hay, grain, potatoes, vegetables and tree fruits. Between Wolfville and Hortonville there are several good orchards on these soils. Some of the steeper slopes are used for pasture.

Moderately severe erosion occurs on slopes over 6 percent and severe erosion on slopes 15 percent or over when crops are cultivated up and down the slope. Some of this can be avoided by cultivating across the slope, planting on the contour, or terracing. Slopes over 15 percent that are cultivated should be kept in grass as long as possible. The maintenance of a good supply of organic matter helps to control erosion and improve the physical qualities of the soil.

These soils have moderate natural fertility, but they require lime and fertilizer to produce a profitable crop. In Kings County they have a slightly better supply of nutrients than in other parts of the province.

Middleton Series (3,452 acres)

The Middleton soils have only a small area (less than 1 percent) in Kings County. They are found in a narrow strip along the base of the North Mountain from Dempsey Corner through North Kingston to the western boundary of the County.

These soils have developed from a dark-red or dark reddish brown clay loam till. The till is usually deep and the solum 25 to 30 inches thick.

The soils are found on gently rolling to steeply sloping land, so that surface drainage is adequate. Internal drainage ranges from imperfect to moderately good. Water percolates readily through the solum, but moves slowly through the massive parent material. Hence, some mottling occurs in the profile. Kingsville soils are found in poorly drained depressions in Middleton soil areas.

The soils are usually not very stony and occasionally the parent material contains only a few stones, particularly where it is associated with the Fash and Pelton series.

Where the Middleton soils are forested, the main trees are spruce, balsam fir, maple, poplar and wire birch.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 10	Dark reddish brown (5YR 3/4) loam; medium and fine, subangular blocky structure; friable; plastic; numerous roots; some stones; pH 5.2.
Bfh1	10 – 20	Dark reddish brown (2.5YR 3/4) clay loam; medium, subangular blocky structure; many faint to prominent strong-brown mottles; plastic; occasional stones; some roots in upper part; pH 5.3.
Bfh2	20 – 30	Dark-red (2.5YR 3/6) clay loam; medium, subangular blocky structure; moderately friable; plastic; some stones and occasional boulders; pH 5.7.
C	30+	Dark-red (2.5YR 3/6) clay loam; firm; subangular blocky structure; plastic; pH 5.8.

Under forest the profile has a thin layer of organic matter on the surface underlain by a thin, pinkish-gray sandy loam or loam (Ae) horizon. On cultivation, these horizons are mixed with the upper B horizon. In some localities the profile is not so red as that described above and resembles those of Wolfville soils in appearance. Usually the upper part of the profile is more distinctly mottled than the lower part. Much of the parent material is massive. The series includes some areas where the surface layer is a loam and the upper part of the subsoil is somewhat coarser textured than described above.

Use

About 65 percent of the Middleton soils in the County are cleared and used for orchard, hay, grain and pasture. Like the Wolfville soils, they are readily eroded when the surface has no cover. About 68 percent of the soils have slopes ranging from 3 to 9 percent. Most of these slopes are in sod, or the cultivated areas are arranged in such a way that erosion is reduced. Nevertheless, some gullying occurs on these slopes. The rest of the soils have slopes up to 16 percent or more and are largely in forest. These slopes become gullied when the forest is removed.

Lime and fertilizers are needed for satisfactory crop production, and maintenance of organic matter improves the physical condition of the soil. The soils are well suited to dairy farming and orchards.

Fash Series (87 acres)

The Fash soils cover a very small area in Kings County, though they have a large area in Annapolis County. The main area in Kings County is south of Lakeville. The soils usually occur on the better-drained positions associated with the Lawrencetown series, but they may be found also in association with the Cornwallis, Canning and Kingsport series.

The parent material is a dark-red silty clay loam deposited by water in shallow lakes. The deposit is usually 3 to 5 feet or more thick and may be underlain by sand or thin layers of sand and clay. The soils are 18 to 24 inches deep. The land is nearly level to gently undulating. The surface drainage is usually adequate, although water may stand on the surface temporarily on areas with little slope. The internal drainage is moderately slow, good structure making them more readily permeable than they would otherwise be. Some mottling occurs throughout the profile. The soils are free from stones except for occasional erratic boulders. The forest vegetation consists chiefly of spruce, poplar and maple.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 8	Reddish-brown (5YR 4/3) silt loam; fine and medium, subangular blocky structure; friable; slightly plastic; pH 4.8.
Bfhgj	8 – 14	Yellowish-red (5YR 5/6) silty clay loam; moderately friable; medium, subangular blocky structure; prominent strong-brown mottling within the peds; pH 4.7.
Bfgj	14 – 18	Yellowish-red (5YR 4/6) silty clay loam; moderately firm; medium, subangular blocky structure; distinctly mottled; gray coatings on cleavage faces; pH 4.6.
C	18+	Dark-red (2.5YR 3/6) silty clay loam; firm; moderately plastic; medium blocky structure; breaking into angular blocks that are platy; pH 4.6.

It is difficult sometimes to distinguish horizons below the plowed layer. Mottling is usually present and increases in degree down slope toward the Lawrencetown soils, which occupy the level or depressional land associated with the Fash soils. Sometimes it is difficult to separate the two series. Small areas having a very fine sandy loam surface were included with the Fash soils.

Use

The Fash soils are used chiefly for hay and grain crops. They have good structure, but this may be easily destroyed if they are not managed properly. If plowed when too wet they tend to puddle and the surface will bake and crack when dry.

Maintaining a good supply of organic matter benefits these soils. It promotes good tilth and supplies nitrogen to the crop. Although the soils have a rather good supply of bases, the surface horizons are acid. Lime and fertilizer are required to produce satisfactory yields. The chief problems are maintenance of organic matter, the preservation of good structure, and drainage.

Hantsport Series (17,871 acres)

The Hantsport soils are chiefly in the eastern part of the County. A large area occurs south of Avonport and west of Hantsport, and smaller areas near Hortonville. These soils occupy about 3 percent of the surveyed area and are associated with the Wolfville and Mahone series.

The Hantsport soils have developed from a reddish-brown shaly loam till on undulating to strongly rolling land. The surface drainage is usually adequate, but internal drainage is moderately slow because of the compact subsoil or shallowness to bedrock. Prominent mottling is common in the profile. The soils are not very stony on the surface, but the underlying shale may outcrop on the hills as the soil is shallow in these areas. Cleared areas occur around Hantsport, Avonport and Hortonville, but most of the soils are under forest (Figure 7). The main trees are spruce, hemlock, poplar, balsam fir, maple and birch. In the wetter areas, tamarack and alder occur. Many of the soils produce good forest.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 - 4	Very dark grayish brown (10YR 3/2) loam; well-developed, coarse granular to medium subangular blocky structure; friable; soft; roots and stone fragments; pH 4.5.
Bfhg	4 - 12	Yellowish-brown (10YR 5/4) loam; weak, medium subangular blocky structure; numerous distinct, fine, yellowish-brown and strong brown mottles; slate fragments and cobbles; pH 4.6.
Bfg	12 - 21	Dark yellowish-brown (10YR 4/4) loam; firm; plastic; prominently mottled; some slate fragments; pH 4.7.
C	21+	Yellowish-red (5YR 4/6) loam; firm; mottled with gray (10YR 6/1) patches; pH 4.7.

In many places the C horizon is more reddish brown than described above. The B horizons are usually friable when dry and more yellowish brown. Near Hantsport and Avonport the soils occur on drumlinoid hills. Here the texture is somewhat finer and the B horizon is reddish gray or reddish brown. Prominent mottling in the B and C horizons is common in these soils. Some of this is due to restricted drainage and some to the color of the decomposing rock fragments. The shallower areas have many slate fragments in the profile.

Figure 7—Hantsport soils are well suited to hay and grain. They have adequate surface drainage, but slow internal drainage. The area shown here is in soil capability Class 3.

Use

About 30 percent, or 5,500 acres, of the Hantsport soils are cleared. The soils, because of their slowness in draining, are slow to warm up in the spring and are better suited to hay and grain crops than for orchards. In favorable seasons,

roots or potatoes may produce a satisfactory crop on slopes where the surface drainage is fairly rapid. About 90 percent of the slopes range from 3 to 9 percent and some care must be taken to retard erosion when clean cultivation is practiced. Steeper slopes should be left in forest.

The soils are acid throughout the profile and require lime and fertilizer to produce good yields. Maintenance of a good level of organic matter helps to improve the structure of the surface layer and, in turn, the tilth and moisture relationship.

Mahone Series (455 acres)

The Mahone soils are interspersed among the Wolfville and Hantsport series where topography and parent material severely restrict drainage. The larger areas of Mahone soils are found around Avonport and south of Hortonville. The parent material, similar to that of the Wolfville and Hantsport series, is a dark reddish brown sandy clay loam or clay loam till. The land ranges from nearly level to depressional, so that both surface and internal drainage are slow. Most areas are moderately stony, and a few very stony. The main vegetation is black spruce, tamarack, red maple and alder.

The profile of a typical cultivated soil is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 6	Dark grayish brown (10YR 4/2) loam; medium granular structure; prominent, fine, strong-brown mottles; plastic; numerous roots; pH 4.2.
Aeg	6 – 14	Gray (5YR 5/1) clay loam; distinctly mottled; plastic; slate fragments; pH 4.5.
Bg	14 – 24	Yellowish-brown (10YR 5/4) sandy clay loam; mottled with gray and strong brown; massive; stone fragments; pH 5.0.
C	24+	Dark reddish brown (5YR 3/4) sandy clay loam; firm; massive; plastic; shale and sandstone fragments; pH 5.2.

Under forest the surface (L-H) horizon consists of black, semi-decomposed organic matter 3 to 8 inches thick. In very poorly drained sites the B horizon has a gray, drab appearance and is prominently mottled. The soils are wet for a large part of the year.

Use

Small areas of the Mahone soils have been cleared where they are associated with cultivated Wolfville soils. If they can be drained, they have about the same value for crops as the Wolfville soils, but generally the Mahone soils are unsuitable for agriculture.

Lawrencetown Series (2,961 acres)

The Lawrencetown soils occupy only a small acreage in Kings County, mainly in two areas: between North Kingston and Parker Road, and south of Weston around the Caribou Bog.

These soils have developed from lacustrine clays on nearly level to depressional land. The clay deposits are thin and may be underlain by sand lenses or alternate layers of sand and clay. Some small depressional areas in which a thin layer of

sand has been deposited over the clay were mapped with the Lawrencetown soils. The fine texture and the topography cause the soils to have very slow drainage. Usually, they are free from stones.

Where the soils are forested they support a growth of spruce, birch, poplar and alder. Some large elm trees also grow on these soils.

The profile of a cultivated soil is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 10	Very dark grayish brown (10YR 4/1) clay; medium, subangular blocky structure; friable; plastic; faint mottling; pH 4.9.
Bg1	10 – 20	Gray (5Y 6/1) and strong-brown (7.5YR 5/6), distinctly mottled silty clay; medium, subangular blocky structure; some roots; pH 5.3.
Bg2	20 – 28	Yellowish-red (5YR 5/6) silty loam; prominent, coarse strong-brown (7.5YR 5/6) mottles; some fine roots; plastic; pH 5.3.
Cgj1	28 – 36	Dark reddish brown (2.5YR 3/4) loam; firm; massive; some gray mottling; pH 5.5.
Cgj2	36+	Dark reddish brown (2.5YR 3/4) loam; firm; plastic; massive; some mottling; pH 6.0.

In the very poorly drained areas these soils have a thick peaty or mucky surface layer over the clayey subsoil. Water may stand on these areas for a large part of the year.

Use

The cleared areas of Lawrencetown soils are used chiefly for hay or pasture. Where drainage can be improved, the soils are suitable for hay and grain, but the hazard of frost makes them unsuitable for a wide range of crops. The surface horizons are acid and lime is required for satisfactory crops. The soils must be handled carefully to maintain their structure, and plowing at the right stage of moisture content is essential. Where the soils can be drained adequately for cropping, organic matter or commercial fertilizers need to be applied to build up humus.

Acadia Series (8,470 acres)

The Acadia soils are found along the rivers draining into Minas Basin. Sediments eroded from the land and scoured from the sea bottom were mixed and deposited by the tides on flood plains along the rivers. The sediments accumulated to a considerable thickness, and were dyked to protect them from further flooding and enable them to be used.

These soils occupy about 1.6 percent of the County. The largest areas occur near Grand Pré and along the Canard and Cornwallis rivers, and smaller areas along the Habitant, Pereau and Gaspereau rivers and near Avonport. The soils occur on nearly level to slightly depressional land and are usually lower near the upland than along the streams. The sediments have not been in place long enough to develop horizons, but the layers differ in color and texture when they are deposited. The natural drainage is poor and may vary within short distances, and artificial drainage is necessary for cropping. The map indicates the natural drainage conditions except for pockets that could not be included on the scale of mapping used.

The surface layers are reddish brown and the underlying sediments are mainly dark gray to bluish gray. Areas differ in thickness of the reddish-brown layer and in drainage. The reddish-brown and gray layers are similar mineralogically except that the reddish layers contain goethite and the gray layers do not (1). The gray layers are strongly acidic, are high in organic matter and have considerable free iron. The gray color is probably produced by reduction of the iron oxides by anaerobic bacteria.

The profile of a moderately well drained, cultivated soil is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 6	Dark reddish brown (5YR 3/4) silty clay loam; medium granular structure; friable; plastic; numerous roots; pH 5.0.
Cg1	6 – 22	Reddish-brown (5YR 4/3) silty clay loam; medium and coarse blocky structure; plastic; mottling along root channels; pH 6.4.
Cg2	22 – 36	Reddish-brown (5YR 4/4) silty clay loam; massive; plastic; breaking into coarse blocks; prominently mottled; pH 6.8.
Cg3	36+	Reddish-gray (5YR 5/2) silty clay loam; massive; prominently mottled; pH 7.4.

The reddish-brown surface layer may be only 10 to 12 inches thick and grade downwards through a reddish-gray to bluish-gray underlying material. All profiles show some mottling, which becomes more pronounced and nearer the surface as drainage becomes poorer. In very poorly drained areas the surface may be peaty.

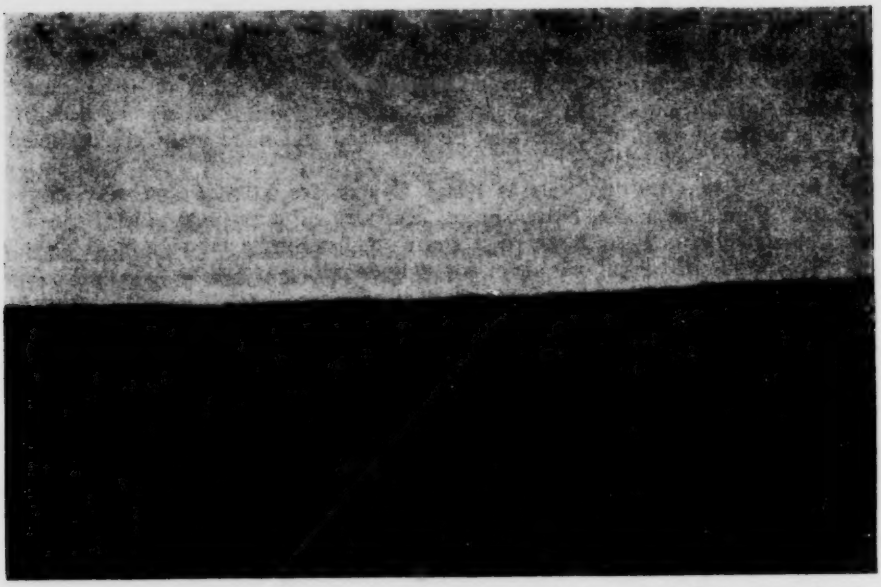

Figure 8—The fertile Acadia soils of the dykelands (Class 3) are used chiefly for hay and grain. They have a moderate frost hazard for cash crops.

Use

The Acadia soils were among the first to be used by the early settlers. Some areas have been dyked and cropped for more than a century. Though they are physically suitable for most crops, hazard of frost limits them to crops like hay, grain and roots (Figure 8). Though the soils are more fertile than the upland soils nearby, lime and fertilizers are necessary for high yields. They require good management because of their fine texture. Addition of organic matter as manure or as cover crops helps to improve the tilth and structure.

The Grand Pré area is one of the best utilized dykeland areas in the province. About 70 percent of it has moderately good drainage through a network of natural and artificial drainage channels. Good crops of hay and grain are produced here and large areas are pastured. The Canard dykeland is about 80 percent moderately well drained and is used like the Grand Pré area. The moderately well drained areas of the Cornwallis (80 percent), Habitant (30 percent), Gaspereau (50 percent) and Pereau (70 percent) dykelands are used for hay, grain and pasture and the more poorly drained areas for pasture.

Soils Developed from Medium-textured Parent Materials

These soils occupy about 14 percent of the County. The Rawdon, Morristown and Pelton soils, which developed from till, and the Stewiacke and Cumberland soils, which developed from alluvium, make up about 93 percent of this group. The Riverport and Bridgeville soils are imperfectly drained and the Middlewood and Chaswood soils are poorly drained. The parent materials usually range from loam to silt loam.

Rawdon Series (516 acres)

The Rawdon soils have a small acreage along the southeastern boundary of Kings County, but they cover a large area in Hants County.

They have developed from a grayish-brown shaly loam till on rolling to hilly land and so have good surface drainage. The porosity of the parent material and nearly vertical drainage channels in the bedrock allow moderately rapid movement of water through the soil. In depressions near these soils, or where the bedrock is close to the surface, drainage may be restricted and these areas are occupied by Riverport or Middlewood soils.

Most of the Rawdon soils in Kings County are forested and very stony. The trees found are maple, birch, spruce, hemlock and occasional pine. The soils are well suited to trees since the roots can readily penetrate the subsoil.

The profile of typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	2 – 0	Black, semidecomposed organic matter; fibrous; numerous roots; pH 3.6.
Ae	0 – 1	Light-gray (10YR 7/1) silt loam; variable thickness; fine granular and weak platy structure; numerous shale fragments; roots; pH 3.4.
Bfh1	1 – 10	Yellowish-brown (10YR 5/4) loam; medium granular structure; friable; shale fragments; pH 4.7.
Bfh2	10 – 20	Grayish-brown (2.5Y 5/2) loam; firm; shale fragments; occasional roots; pH 5.0.
C	20+	Olive-gray (5Y 5/2) loam; firm; porous; granular; numerous shale fragments; pH 4.9.

The parent material may be compact in some sites but water seems to penetrate readily.

Use

The Rawdon soils in Kings County are too steep or stony for agriculture. They are suitable for forest.

Morristown Series (55,613 acres)

The Morristown soils cover about 10 percent of the County. Except for some small gaps, they occupy the northern slope of the South Mountain from the western boundary of the County to Wolfville. South of Wolfville and Kentville the soils cover a large area on the top of the mountain, extending southward to Black River Lake.

They have developed from a reddish-brown shaly loam till. They resemble the Wolfville soils in appearance, but are coarser in texture.

The land ranges from undulating to rolling or hilly. Some of the hills have steep slopes. Stones vary from few to many and about 40 percent of the soils are too stony for agriculture.

The soils seem to be well adapted to forest and tree roots are able to penetrate the shaly material. The main trees are spruce, hemlock, wire birch, maple and poplar.

A profile of a Morristown soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 4	Very dark grayish brown (10YR 3/2) loam; fine, sub-angular blocky structure; friable; some shale fragments; roots; pH 4.6.
Bfh1	4 – 10	Yellowish-red (5YR 4/6) loam; coarse granular structure; friable; slightly firm; shale fragments; pH 4.9.
Bfh2	10 – 22	Reddish-brown (5YR 4/4) sandy loam; medium granular structure; moderately firm; pH 4.9.
BC	22 – 36	Reddish-brown (5YR 4/4) sandy loam; firm; granular; faint mottling; some shale fragments; pH 5.0.
C	36+	Reddish-brown (5YR 4/3) loam; firm; granular; some stones and shale fragments; pH 5.3.

The A and upper B horizons have good structure. There is very little change in color between the B and C horizons. Where the soil is shallow, shale and flaggy stones are common through the profile. Shallow areas occur south of Casey Corner, along the Lockhart Road, at Beech Hill and Greenfield and south of New Canaan. In the Forest Hill area the soils resemble the Rawdon series but have reddish parent material. These were included with the Morristown soils, along with a small area east of New Canaan where the parent material contains some greenish chloritic schist. The color of the B horizon ranges from brown to yellowish-red and the parent material from reddish-brown to dark red. Under forest the soil has a thin organic surface layer (L-H) underlain by 1 to 2 inches of pinkish-gray to gray sandy loam (Ae). The solum is usually very friable and mellow.

Use

Only about 27 percent of the acreage is suitable for agriculture. The rest is too steep or stony, but is suitable for forest. About 15,000 acres are considered

suitable for agriculture, of which 85 percent is cleared and about 11,000 acres have slopes less than 6 percent. These soils are easily eroded, and clean cultivation is not recommended on slopes over 5 percent unless special practices are followed.

The main crops grown are hay, grain and tree fruits. The nearly level land is suitable for vegetables and cash crops, but shallow areas should be left in forest.

The soils are acid throughout the profile, and lime is necessary if full benefit is to be derived from fertilizers. The natural fertility is low and fertilizers are needed for good yields. The soils tend to dry out in the summer and maintaining a good supply of organic matter helps to increase the moisture-holding capacity. Some of the longer slopes have seepage spots, and some large fields may have wet areas.

Pelton Series (11,332 acres)

The Pelton soils occur in a narrow band along the southern slope of the North Mountain from Blomidon westward to Dempsey Corner. They occupy about 2 percent of the County.

They have developed from a dark-red loam derived from a soft red shale that occurs as sloping ramps against the North Mountain. They are almost free from surface stones and the soft shale breaks up readily.

The land ranges from undulating to steeply sloping, some areas at the base of the Mountain having rolling topography. The soils are easily eroded and considerable sheet erosion takes place when the surface is bared. The area is cut by gullies where streams run down the mountain slopes.

Both surface and internal drainage are good and the soils usually hold moisture well. Seepage of water from the North Mountain supplies moisture throughout the growing season.

About 75 percent of the soils have been cleared. Where they are forested they support a good growth of spruce, poplar, maple and birch.

The profile of a typical soil under pasture is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 2	Light-brown (7.5YR 6/4) loam; fine granular structure; pH 4.2.
Ae	2 – 6	Light reddish brown (5YR 6/3) sandy loam; very friable; fine, granular to weak, subangular blocky structure; pH 4.7.
Bfh1	6 – 18	Reddish-brown (2.5YR 4/4) loam; medium, subangular blocky structure; friable; slightly firm; pH 4.9.
Bfh2	18 – 24	Dark-red (2.5YR 3/6) loam; friable; medium, subangular blocky structure; pH 5.0.
C	24+	Dark-red (2.5YR 3/6) loam; firm; massive; some shale fragments; pH 5.0.

Small areas of the Pelton series have a silt loam texture. The material has a smooth, soft feeling throughout the profile and the amount of shale in the various horizons varies considerably. Roots extend down to the lower B horizon.

Around Delhaven the soils are interspersed with Canning soils and the surface layer is a sandy loam. Near Buckley Corners the soil is silt loam in texture and was evidently waterworked. It is somewhat similar to the Fash series here.

Use

The Pelton soils are used for fruit growing, dairying and mixed farming, some of the orchards being excellent. About 75 percent of the 8,500 acres that have been cleared have slopes of more than 6 percent. These slopes should be kept in sod or cultivated infrequently to reduce erosion. Weaker slopes (A and B on the map) are better suited to clean cultivation although care must be exercised even on them. A good supply of organic matter, liming and fertilizers are necessary for good crop yields.

Stewiacke Series (360 acres)

The Stewiacke soils are not very extensive in the County but they occupy large areas in some other counties of the province. They merge into Bridgeville and Chaswood soils, which are imperfectly and poorly drained respectively. In Kings County they occur north of Berwick town, where they have developed on nearly level alluvial deposits. These consist of reddish-brown silt loam, 3 to 5 feet or more deep, deposited by floodwaters of nearby rivers.

They are moderately well drained and free from stones. In Kings County the Stewiacke soils are all cleared, but there are occasional large elm trees.

A profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 - 6	Very dark grayish brown (10 YR 3/2) silt loam; fine granular structure; very friable; numerous roots; pH 5.5.
C1	6 - 20	Reddish-brown (5YR 4/4) silt loam; weak platy structure; slightly plastic; friable; pH 5.6.
C2	20 - 36	Reddish-brown (2.5YR 4/4) silt loam; firm; medium, subangular blocky structure; pH 5.8.

In some areas the lower part of the profile is a silty clay loam, particularly where the soils are interspersed with Acadia soils.

Use

The Stewiacke soils are used mainly for hay and pasture. They are moderately high in natural fertility, but their use is limited by the hazards of frost and occasional flooding. Usually the area on an individual farm is small.

Cumberland Series (1,974 acres)

The Cumberland soils (Figure 9), like the Stewiacke series, have developed from alluvial deposits. They occur along the floodplains of the Cornwallis and Annapolis rivers and their tributaries. Their total acreage in Kings County is small and usually they occur as narrow bands along the stream courses. They have developed only a surface horizon. The land is nearly level and free from stones.

The parent material is reddish-brown or dark reddish brown sandy loam. It varies in depth from 1 to 4 feet and is underlain by gravel or coarse sand. The drainage ranges from good to excessive. Some areas are covered with spruce, red maple, fir and occasional pine.

Figure 9—In some places the alluvial Cumberland soils are deep. They have not been in place long enough to develop horizons.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 6	Dark-brown (7.5YR 3/2) sandy loam; strong, medium granular structure; friable; numerous roots; pH 5.2.
C1	6 – 18	Reddish-brown (5YR 4/4) sandy loam; weak platy and fine granular structure; friable; porous; pH 5.1.
C2	18 – 24	Yellowish-red (5YR 4/8) sandy loam; firm; porous; granular; pH 5.2.
C3	24+	Reddish-gray (5YR 5/2) sand.

On some sites the subsoil is a loam. Some areas are shallow over gravel.

Use

Use of these soils is limited by their small acreage and susceptibility to flooding and frost. Hay and grain are grown on the more favorable areas, but most of the soils are used for pasture. In most areas, small pockets of moderately drained Bridgeville and poorly drained Chaswood soils are an obstacle to cultivation. If drainage could be improved and flooding prevented, the Cumberland soils would be suited to most crops. They are moderately fertile, but need liming and fertilizers for good crop yields. About 65 percent of the soils are cleared.

Riverport Series (1,000 acres)

The Riverport soils are interspersed with Morristown soils where the topography or the bedrock slows the internal drainage. They have only a limited acreage in the County, but large areas occur in other parts of the province, notably Guysborough, Halifax, Lunenburg and Queens counties.

They have developed from shaly or slaty loam till that is usually thin over bedrock. The land ranges from undulating to nearly level and most areas are moderately stony. Usually, surface drainage is adequate, but the movement of water through the soil is slowed by the bedrock.

Most of the Riverport soils in the County are forested with spruce, red maple, tamarack, balsam fir, and some hemlock.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	3 – 0	Black, semidecomposed organic matter; greasy mor; pH 3.5.
Ae	0 – 2	Gray (10YR 6/1) silt loam; slightly plastic; friable; some shale fragments; roots; fine granular structure; pH 4.2.
Bfhgj1	2 – 8	Brown (7.5YR 5/2) loam; medium granular structure; distinct yellowish-brown mottles; friable; shale and slate fragments; pH 4.8.
Bfhgj2	8 – 15	Reddish-gray (5YR 5/2) shaly loam; medium, subangular blocky structure; firm; distinct gray and yellowish-brown mottles; pH 5.0.
C	15+	Reddish-gray (5YR 5/2) shaly loam; medium granular structure; firm; numerous shale and slate fragments and flags; gray and strong-brown mottles; pH 5.2.

The Riverport soils in the County have a reddish cast where they are interspersed with Morristown soils. Usually the parent material is grayish brown or olive brown.

Use

About 60 percent of the Riverport soils in the County are suitable for agriculture, but only about 18 percent of this acreage has been cleared. Some small areas are cultivated because they intermingle with Morristown soils; they are used chiefly for pasture at present.

Bridgeville Series (2,616 acres)

Bridgeville soils intermingle with Cumberland and Stewiacke soils on floodplains of the rivers throughout the County. The larger areas are found along the Annapolis and Cornwallis rivers.

The parent materials are alluvial sediments of fine sandy loam to silt loam. In places these sediments are thick and may contain layers that differ markedly in texture. Usually the sediments overlie coarse sand, but occasionally they overlie peat.

The land is nearly level to slightly depressional and is free from stones. The drainage is moderately slow because the water table is high for long periods and fine-textured layers in the soil may restrict drainage. This is indicated by mottling in the profile and by the vegetation, which consists of black spruce, tamarack, red maple, poplar and alder.

A profile of a typical Bridgeville soil on the deep deposits is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 9	Dark reddish-brown (5YR 3/4) fine sandy loam; fine and coarse granular structure; very friable; numerous roots; pH 4.5.
Cgj1	9 – 27	Reddish-brown (5YR 4/4) sandy loam; medium granular structure; friable; faint mottling; pH 5.0.
Cgj2	27 – 36	Reddish-brown (5YR 4/4) loamy sand; medium granular structure; moderately firm; faint mottling; pH 5.3.
Cgj3	36 – 43	Reddish-brown (5YR 4/3) sandy loam; single-grained; firm; distinct yellowish-red and gray mottles.
Cgj4	43 – 52	Yellowish-red (5YR 4/8) sand; firm; single-grained; prominent strong-brown mottles.
IICgj	52 – 58	Grayish-brown (2.5Y 5/2) sandy clay loam; firm; slightly plastic; prominent mottles.
IIICgj	58+	Gray (10YR 5/1) coarse sand; many prominent mottles; small streaks of fine clay.

Where the soils are shallow the upper horizons may be more strongly mottled than deeper ones; the surface horizon is usually darker than in the Cumberland soils, and some areas are finer-textured in the upper horizons than the profile described above.

Use

Where they can be drained, by lowering the water table or using tile drains, the Bridgeville soils have the same uses and management problems as the Cumberland soils.

Because of their position, susceptibility to flooding and frost limits the range of crops that can be grown. They are now used for hay and pasture. Usually the area on an individual farm is too small for commercial production of crops. About 95 percent of the soils in Kings County are cleared.

Middlewood Series (260 acres)

The Middlewood soils have developed from shaly loam till and occur where drainage is poor because of topography or shallowness to bedrock. They intermingle with Morristown and Riverport soils, and have a small acreage in Kings County though large acreages occur in some other counties.

Usually the surface stones and boulders are numerous enough to make clearing for agriculture impractical. The trees found are black spruce, tamarack, balsam fir, red maple and alder.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	4 – 0	Black (5Y 2/1), semidecomposed organic matter; greasy mor; some fibrous roots; pH 4.6.
Aeg	0 – 6	Dark-gray (5Y 4/1) loam; medium granular structure; some faint-brown mottles; shale fragments; pH 4.8.
Bg	6 – 16	Gray (5Y 5/1) loam; medium granular; firm; shale fragments; pH 4.8.
BCg	16 – 20	Dark-brown (7.5YR 3/2) shaly sandy loam; firm; many prominent yellowish-brown and gray mottles; numerous shale fragments; pH 5.0.
C	20+	Grayish-brown (2.5Y 5/2) shaly loam; firm; prominent mottles; pH 5.0.

Where the soils intermingle with Morristown soils, they have a reddish cast and the C horizon may be a reddish-brown sandy clay loam. In other areas the lower B horizons are olive gray.

Use

The Middlewood series generally is not suited to agriculture and should remain in forest. Small areas intermingling with Morristown soils, have been cleared and these may appear as wet spots in the fields.

Chaswood Series (1,214 acres)

The Chaswood soils are found in poorly drained positions on alluvial deposits along the rivers. They usually occur near the upland where the floodplain is lower than along the river course and drainage is slow. They also receive water from the upland. Hence they are wet for a large part of the year.

They intermingle with Cumberland and Bridgeville soils and are free from stones. The tree cover is mainly black spruce, tamarack and alder. The cleared areas are covered with swamp grass, sedges and cattails.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 6	Very dark grayish brown (10YR 3/2) loam; granular; some fine gray mottles; pH 5.4.
Cg1	6 – 12	Dark-brown (7.5YR 4/2) loam; granular; many prominent reddish-brown and gray mottles in the matrix and along root channels; pH 5.4.
Cg2	12 – 24	Grayish-brown (10YR 5/2) loam; prominent yellowish-red and strong-brown mottles; weak blocky structure; pH 4.9.

Under natural conditions the surface is often peaty. The texture ranges from fine sandy loam to clay loam, but is mainly silt loam. The lower horizons are strongly gleyed.

Use

Where these soils are not too wet they are used chiefly for pasture. They require drainage before they can be used for crops.

Soils Developed from Moderately Coarse Textured Parent Materials

The soils in this group occupy nearly 60 percent of the land area of the County. A large part of the agricultural production comes from the soils in this group. All except the Avonport soils have developed from glacial till. The well-drained series — Rossway, Woodville, Glenmont, Avonport, Somerset, Berwick, Bridgetown, Halifax and Gibraltar — occupy about 94 percent of the acreage of the group. The series with imperfect drainage — Roxville, Debert, Kentville, Annapolis, Danesville, and Bayswater — and those with poor drainage — Tiddville, Masstown and Aspotogan — occupy 4 and 2 percent.

About 15 percent of the total acreage of these soils is cleared, but some soils have more than 90 percent under cultivation. Within the group also are large areas of very stony soils unsuitable for agriculture.

Woodville Series (14,558 acres)

The Woodville series occupies nearly 3 percent of the County. The larger areas are found near Medford, Canning, Hillaton, Canard, Port Williams and from Kinsman Corner to north of Centreville. The soils occur on undulating to gently rolling land in association with the Somerset, Pelton, Canning and Kentville series.

The soils have developed from a dark-red sandy loam till that in some places appears to have been waterworked. The Triassic sandstone, from which most of the parent material is derived, ranges in texture from fine to coarse and may be cemented with calcium carbonate, which is leached out when the rock decomposes. Thus the texture of the till may range from fine to fairly coarse sandy loam. Where the soils merge with Kentville and Pelton soils, the subsoil is somewhat finer in texture.

Both surface and internal drainage are moderately rapid.

The soils are largely free from surface stones except for occasional erratic boulders. Only a small part of the acreage is forested, the trees being spruce, wire birch and pine.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 - 6	Dark reddish brown (5YR 4/4) sandy loam; weak, fine granular structure; very friable; some traces of an Ae horizon; PH 4.8.
Bfh1	6 - 16	Yellowish-red (5YR 4/6) sandy loam; slightly firm; moderately developed medium granular structure; small roots in upper part; PH 5.2.
Bfh2	16 - 24	Yellowish-red (5YR 4/6) sandy loam; firm; has small aggregates that crush easily; some stone fragments; pH 5.2.
Bf	24 - 30	Dark-red (2.5YR 3/6) sandy loam; firm; some small stones; pH 5.2.
C	30+	Dark-red (2.5YR 3/6) fine sandy loam; firm; breaks out in thin plates; platy to massive; pH 5.1.

Near Blomidon the surface layer is a loam, becoming sandier with depth. Along the road from Canning to the Look-Off, the surface is a sandy loam, but the subsoil is a loam. Between Port Williams and Starrs Point the B horizon is loamy, but the parent material is coarser than usual. In a few places the upper B horizon is weakly cemented, but does not form a hardpan and drainage is not restricted appreciably.

Use

The Woodville soils are among the best agricultural soils in the province. They are adapted to a wide range of crops and are used for hay, grain, tree and small fruits and cash crops. Nearly 60 percent of the acreage has slopes of less than 6 percent and, except for a few steep slopes, all of the acreage has slopes of less than 9 percent. Erosion is not a serious problem on slopes less than 5 percent on these soils.

The soils are acid throughout the profile and the pH must be raised through liming for satisfactory results from application of fertilizers. The soils are moderately well supplied with nutrients but respond well to fertilization. Maintaining a good supply of organic matter improves the tilth and moisture-holding capacity and promotes activity of beneficial microorganisms.

Berwick Series (11,044 acres)

The Berwick soils occur mainly on the south side of the Valley floor and along the lower slopes of the South Mountain. They cover about 2 percent of the County. The larger areas are found around Berwick and between Greenwood and Millville. Smaller areas occur along the South Mountain between Cambridge and Kentville and between Wolfville and New Minas. The soils are the main ones at the Research Station of the Canada Department of Agriculture at Kentville.

These soils have developed from a dark-red sandy loam or gravelly sandy loam till containing sandstone, shale, and trap rock. In some places the till has been reworked by water.

The soils occur mainly on nearly level to gently rolling land, but a few of the slopes are steep. The surface drainage is good and internal drainage moderately rapid. Stoniness is not usually a problem and about 50 percent of the soils have been cleared.

They are adapted to forest, the trees found being spruce, hemlock, maple, white birch, yellow birch, beech and pine.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L - H	2 - 0	Very dusky red (2.5YR 2/2), semidecomposed organic matter.
Ae	0 - 2	Pinkish-gray (7.5YR 6/2) loamy sand; moderate, fine granular structure; friable; numerous roots; pH 4.6.
Bfh	2 - 8	Strong-brown (7.5YR 5/6) loamy sand; moderate, fine granular structure; friable; porous; numerous roots; pH 5.2.
Bf	8 - 16	Yellowish-red (5YR 4/6) sandy loam; moderate, fine granular structure; moderately firm; pH 5.0.
C	16+	Yellowish-red (5YR 4/8) sandy loam; firm; weak platy structure; some gravel; pH 5.3.

In many areas the upper B horizon is yellowish red and finer-textured and more cohesive than described above. The parent material may be dark red and contain considerable gravel. The soils often intermingle with Cornwallis and Wolfville or Morristown soils and then have characteristics ranging between these soils. Where they merge with Somerset soils, they are difficult to separate.

Use

Most of the Berwick soils are suitable for agriculture. About 50 percent of the acreage is cultivated and 80 percent of these areas have slopes of less than 6 percent. The soils are suitable for all crops grown in the area and are used for hay, grain, vegetables, cash crops and tree fruits. They are not as well adapted to hay and pasture as some of the finer-textured soils because they may dry out during the summer.

The soils are acid throughout the profile and require liming for best results from fertilizers. The porous subsoil permits fairly rapid leaching. The soils have low natural fertility, and satisfactory yields can be obtained only by proper fertilization and maintaining a good level of organic matter.

Somerset Series (12,549 acres)

The Somerset soils are similar in appearance to the Woodville series, but have developed from a coarser-textured till. The largest acreage extends from Hillaton through Sheffield Mills and Centreville nearly to Lakeville. Smaller areas occur between Somerset and Dempsey Corners and near Aylesford. They merge into the Cornwallis, Woodville and Canning soils, sometimes in a complex pattern, and it is difficult to separate them.

In places the till has been severely waterworked. The bedrock is usually a fine conglomerate that breaks down to a reddish-brown or dark-red coarse sandy loam. About 80 percent of the soils are on nearly level to undulating land and the rest are gently rolling. The soils have good surface and internal drainage.

Stoniness is not a problem, but in a few places the bedrock is close to the surface.

The main trees are spruce, wire birch, poplar and pine.

The profile of a typical cultivated soil is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 3	Grayish-brown (10YR 5/2) loamy sand; loose; very friable; fine granular structure; pH 4.7.
Ae	3 – 12	Light-gray (10YR 7/2) medium and coarse sand; loose; medium granular structure; pH 4.8.
Bfhc1	12 – 20	Yellowish-red (5YR 4/8) coarse sandy loam; firm; massive; iron-cemented; breaks out in angular blocks; pH 4.9.
Bfhc2	20 – 30	Dark-red (2.5YR 3/8) loamy sand; firm; weakly cemented; massive; pH 5.0.
C	30+	Yellowish-brown (10YR 5/4) sand; firm; moderate, single-grained structure; pH 4.9.

A fairly large part of the acreage has the iron-cemented hardpan (Figure 10) described above, particularly in the eastern part of the County, where the soils are somewhat coarser-textured than in the western part. The hardpan evidently

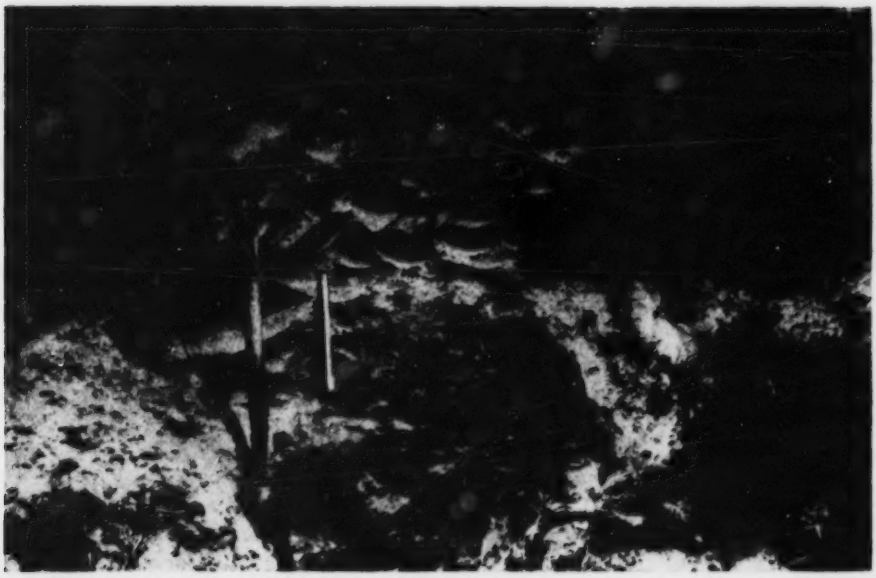

Figure 10—The Somerset soils are moderately coarse textured and may be weakly cemented in the B horizon. The tape indicates the thickness of the cemented layer.

interferes little with drainage, but roots penetrate it with difficulty. The areas southwest of Sheffield Mills and north of Berwick are practically free from hardpan and are loamier in texture. Here they resemble the Berwick soils in some respects.

Use

The Somerset soils tend to be droughty and require a good supply of organic matter to increase their water-holding capacity. They are used mainly for potatoes, small fruits, hay, grain (Figure 11) and tree fruits. Orchards do not seem to do as well as on the Woodville soils, and on the coarser-textured areas many trees have been pulled out. The soils have low natural fertility and are acid. Hence, they require lime and fertilizers to produce good yields. The coarser-textured areas and those with hardpan should be left in forest. Other areas will respond well to careful management and give good crops. About 55 percent of the acreage have been cleared.

Avonport Series (1,049 acres)

The Avonport soils are found in a few isolated areas where alluvial sands have been deposited over clay. The deposits range in depth from two to five feet. The larger areas occur west of Lakeville and around Avonport.

The land is nearly level and the soils are free from stones. The drainage is usually adequate, but the soils remain moist longer than the surrounding sandy soils because the underlying clay restricts moisture movement. The profile is faintly mottled and in some sites the soils resemble the Kingsport series but have better drainage.

Figure 11—The smoother areas of Somerset soils are used for a wide range of crops. Oats in foreground, peas in background.

Where the soils are forested they support a good growth of spruce, maple, poplar and wire birch.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 - 8	Reddish-brown (5YR 4/4) sandy loam; fine granular structure; friable; pH 4.8.
Ae	8 - 12	Gray (5YR 6/1) fine sand; friable; single-grained; faint mottling; pH 5.0.
Bfhgj	12 - 30	Red (2.5YR 5/8) loamy sand; friable; single-grained; thin streaks of clay in lower part; faint strong-brown mottles; pH 5.2.
IICgj	30+	Dark reddish brown (5YR 3/4) clay; massive; plastic; faintly mottled; pH 5.3.

Where the deposits are thicker over the clay than in the above profile, the upper part of the B horizon is not as red. The clay layer may be only several inches thick and underlain by coarse sand.

Use

The Avonport soils are used mainly for hay and pasture. Though they hold moisture better than the surrounding sandy soils, they drain fairly rapidly and may be droughty in prolonged dry periods. They require lime, organic matter and fertilizers to produce good yields. Most of the acreage is cleared. The depth to the underlying clay may vary considerably within short distances. Then the crops are spotty because of variation in the moisture supply.

Glenmont Series (16,566 acres)

The Glenmont soils are found on the North Mountain, the larger areas being near Glenmont and West Glenmont, north and east of Garland, between Ross Corners and Vernon Mines, around Burlington and west of Viewmount. They occupy about 3 percent of the County.

They have developed from a reddish-brown sandy loam to loam till that contains much basaltic rock. They look like the Berwick soils, but are not so sandy and are better supplied with nutrients.

The land ranges from undulating to gently rolling and both surface and internal drainage are good. Stoniness is not usually a problem, though there are a few areas that are shallow or have some large boulers on the surface.

Large acreages are forested, the main trees being yellow birch, wire birch, maple, fir and spruce.

The profile of a typical soil under pasture is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 5	Very dark grayish brown (10YR 3/2) loam; weak, medium granular structure; friable; pH 5.6.
Bfh1	5 - 10	Reddish-brown (5YR 4/4) loam; very friable; weak, fine granular structure; numerous roots; small stones; pH 5.5.
Bfh2	10 - 18	Reddish-brown (5YR 4/4) silt loam; weak, subangular blocky structure; firm; stone fragments; pH 5.5.
Bfh3	18 – 28	Yellowish-red (5YR 4/6) silt loam; weak, medium, subangular blocky structure; moderately friable; some roots; pH 5.9.
C	28+	Dark reddish brown (5YR 3/4) loam; moderately firm; fragments of trap rock; pH 5.9.

The Glenmont soils intermingle with the Rossway soils and are distinguished from them by their red color and finer texture.

Use

Only about 16 percent of the acreage is cleared. The soils are suitable for most crops grown in the County and give excellent yields of grain, potatoes and canning crops. They do not seem to be suited to tree fruits. Though the soils are better supplied with calcium and magnesium than many of the soils in the County, they are acid, are low in available phosphorus and require lime and fertilizer for high productivity. The virgin soils are fairly well supplied with organic matter, but it also needs to be maintained for high productivity. Most of the forested areas are difficult of access and should be left in forest for the present.

Bridgetown Series (29,849 acres)

The Bridgetown soils occur almost entirely in the southern part of the County. The larger areas are found around Gaspereau and Murphy lakes and from Lake Paul and Hardwood Lake southward to the border of Lunenburg County. The soils look like Wolfville and Gibraltar sandy loams, into which they merge near the Lunenburg County boundary. They occupy about 6 percent of the County.

The soils have developed from a reddish-brown sandy loam till brought from the north by the glaciers and mixed with locally weathered granite and some quartzite. The till is commonly moderately stony and often shallow. Granite boulders are found on the surface.

The land is undulating to strongly rolling, and both surface and internal drainage are adequate.

The soils are nearly all under forest, the trees found being spruce, pine, maple, birch, beech and occasional oak.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L - H	2 - 0	Black, semidecomposed leaf litter; felty and fibrous; pH 3.7.
Ae	0 - 2	Reddish-gray (5YR 5/2) sandy loam; weak, medium granular structure; friable; numerous roots; pH 3.8.
Bfh1	2 - 12	Yellowish-red (5YR 4/6) sandy loam; weak, medium granular structure; friable; some roots; granite pebbles; pH 4.7.
Bfh2	12 - 16	Reddish-brown (5YR 4/3) sandy loam; moderately firm; moderate, medium granular structure; some stones and gravel; pH 5.0.
BC	16 - 20	Dark reddish brown (5YR 3/4) sandy loam; moderate, medium granular structure; firm; stones and cobbles; pH 5.0.
C	20+	Reddish-brown (2.5YR 4/4) sandy loam; firm; stones; pH 5.2.

Where the soil is cultivated, the surface layer is a dark-brown (7.5YR 3/2) sandy loam about 8 inches thick. The upper B horizon is yellowish brown in some places where the soils merge into Gibraltar soils.

Use

Only about 7 percent of the acreage is suitable for agriculture. The rest, though it has favorable topography, is too stony to make clearing practical and is well forested.

Small areas are cultivated and used for hay, grain, vegetables and some tree-fruits. The soils are very porous and are sometimes droughty. They require a good level of organic matter to improve their moisture-holding capacity and to minimize erosion. They are acid and have low natural fertility, so that liming and fertilization are necessary for successful crop production. Orchards do not grow as well on these soils as on some other soils in the County.

Rossway Series (71,700 acres)

The Rossway soils cover large areas of the northern slope of the North Mountain and occupy more than 13 percent of the County.

The land is mainly undulating to rolling, but some slopes are steep. The bedrock outcrops on the tops of many of the knolls, and on much of the acreage the soils are shallow or have deep and shallow spots within short distances. The drainage is adequate except in some spots where the water may be held up by the bedrock.

The soils have developed from dark-brown or dark yellowish brown sandy loam till derived almost entirely from the underlying basaltic rock. The till contains some reddish-brown material where the soils intermingle with Glenmont soils. The upper B horizon is high in organic matter and is dark colored.

The soils are stony and only about 12 percent of the acreage is cleared.

The main trees are maple, yellow birch, beech, red spruce, white spruce, poplar and alder.

The profile of a soil under forest, near Glenmont, is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	3 – 0	Black, granular organic matter; numerous roots; very friable; pH 5.1.
Ae	0 – 2	Weak-red (2.5YR 5/2) silt loam; medium granular structure; friable; porous; pH 5.3.
Bh	2 – 12	Dark reddish brown (5YR 3/4) silt loam; moderate, fine granular structure; friable; porous; numerous roots; stone fragments; pH 5.5.
Bfh	12 – 24	Yellowish-red (5YR 4/6) sandy loam; massive; friable; a few roots; some stones and cobbles; pH 5.7.
C	24+	Dark-brown (7.5YR 4/2) sandy loam; firm; gravelly; porous; pH 5.9.

In many places the L-H horizon is thicker than described above and the lower B horizon is dark yellowish brown. The B horizon is usually a sandy loam.

Use

About 60 percent of the acreage is suitable for agriculture, but only about 18 percent of this area has been cleared. Even where stoniness is not serious, the intermittent outcropping of the bedrock and the intermittent shallowness of the soil make cultivation impractical. Where the soils are largely uniform in depth, they are suitable for a fairly wide range of crops and may give good yields of hay, grain, potatoes and vegetables. The soils are readily eroded and require careful handling. A good supply of organic matter is important. Although better supplied with nutrients than most of the soils of the County, they respond to fertilization. They are acid and require liming for best results from fertilization.

Halifax Series (11,600 acres)

The Halifax soils occupy slightly more than 2 percent of the County and occur mainly in two large areas: one around the headwaters of the south branch of the Annapolis River, and the other west of McGee Lake.

They have developed from an olive-colored, stony, sandy loam till in which the main rock is quartzite. This porous material permits rapid drainage.

The soils occur on undulating to gently rolling land in association with Gibraltar soils. They are very stony and are mostly under forest. The trees found are spruce, balsam fir, maple, wire birch, hemlock and some oak and pine.

The profile of a typical sandy loam under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	2 – 0	Black, semidecomposed organic matter; fibrous; very friable; pH 3.5.
Ae	0 – 3	Pinkish-gray (7.5YR 6/2) sandy loam; fine granular structure; friable; porous; numerous roots; pH 3.6.
Bfh	3 – 7	Strong-brown (7.5YR 5/6) sandy loam; moderate, medium granular structure; friable; numerous roots; quartzite and slate stones; pH 4.5.
Bf	7 – 24	Yellowish-brown (10YR 5/4) sandy loam; moderate, medium granular structure; slightly firm; some stones; pH 5.1.
C	20+	Light-olive (2.5Y 5/4) sandy loam; firm; massive; numerous stones; pH 5.2.

Where the Halifax soils border on Morristown soils the B horizon may have a reddish cast. In a few places the upper B horizon may be weakly cemented and is a silt loam.

Use

Practically none of the acreage of Halifax soils in Kings County is suitable for agriculture because of excessive stoniness. A few areas have been cleared, but these are used chiefly for pasture. The soils support good forest and should be used for this purpose as they are largely on watershed areas where runoff can be controlled through proper forest management.

Gibraltar Series (126,212 acres)

The Gibraltar soils cover a larger area in the County than any other series. They occupy about 24 percent of the County, entirely in the southern part.

They have developed from a pale yellowish brown sandy loam till derived mainly from granite. The land is undulating to rolling with some steep slopes. The open, porous soil allows rapid drainage. The soils are usually very stony. These soils are well forested, the main trees being red spruce, white spruce, maple, wire birch, poplar, pine and some oak.

The profile of a typical sandy loam under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	2 – 0	Black, semidecomposed organic matter; friable; fibrous; felty mor; pH 4.0.
Ae	0 – 3	Gray (5YR 5/1) sandy loam; single-grained; very friable; some roots; granite fragments; pH 4.2.
Bfhcj	3 – 5	Dark reddish brown (5YR 3/4) sandy loam; weakly cemented; stained with organic matter; granite stones; pH 4.7.
Bfh	5 – 19	Yellowish-brown (10YR 5/8) sandy loam; moderately firm; weak, medium granular structure; granite stones and cobbles; pH 5.0.
C	19+	Pale-yellow (2.5Y 7/4) coarse sandy loam; firm; massive; some gravel and granite cobbles; pH 5.0.

In the area near Lake Paul the Gibraltar soils have a slight reddish cast and grade into Bridgetown soils. The upper B horizon is usually dark, but not always cemented. North of Lake George the soils are shallow and bedrock is close to the surface. On the more nearly level areas the L-H horizon is thicker than described above and may be somewhat peaty.

Use

The Gibraltar soils in Kings County are unsuitable for agriculture because of excessive stoniness or shallowness. They are well adapted to forest but it is difficult to practice selective cutting because of stoniness. Hence, the forest is usually left for long periods and then cut indiscriminately so that it is very vulnerable to forest fires. After the trees have been removed, the soils dry out quickly and fires burn deep into the B horizon, destroy all organic matter, and retard natural reforestation.

Debert Series (3,323 acres)

The Debert soils occupy a rather small area in Kings County. The larger acreages occur west of Berwick West and east of Somerset. Smaller areas are found on the North Mountain in association with Glenmont soils.

They occur on nearly level to gently undulating land in association with Woodville, Somerset and Berwick soils where drainage is imperfect.

The parent material is a reddish-brown to dark reddish brown sandy loam or gravelly sandy loam till. It appears to have been waterworked somewhat, like that of the Somerset soils, and may merge into water-deposited materials. The soils are not very stony. The drainage is moderately slow and the lower horizons are mottled. The water table is near the surface during the spring.

About 60 percent of the acreage is still under forest. The trees found are spruce, fir, maple, poplar and alder.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	3 – 0	Largely an F layer of decomposed moss; dark brown and fibrous; pH 3.8.
Ae	0 – 4	Gray (5YR 6/1) sandy loam; structureless; dark splotches of organic matter; tongued into upper B horizon; pH 4.3.
Bfhg	4 – 12	Reddish-brown (5YR 4/4) sandy loam; massive; distinct, strong-brown (7.5YR 5/6) mottles and darker streaks; some stones; pH 4.7.
Bfg	12 – 24	Reddish-brown (5YR 4/3) sandy loam; massive; strong-brown mottles and gray streaks; some stones; pH 4.9.
C	24+	Reddish-brown (2.5YR 4/4) sandy loam; firm; mottled; some slate and igneous rock fragments; pH 4.8.

The B horizon is yellowish red and the C horizon dark red in some locations. The L-H horizon may be peaty to a depth of 10 inches and the profile more prominently mottled than described above. In these areas the soils usually grade into Masstown soils, which are poorly drained. The area of Debert soils north of Berwick is complex, with Somerset soils on the well-drained positions on the very gently undulating land and Debert soils on the more nearly level areas. Near old stream channels the deposits have alternately coarse and fine materials because of considerable reworking. This is particularly true along the roads from Berwick to Grafton and to Somerset. The soils in this area also contain considerable granitic material.

Use

The Debert soils are used chiefly for hay and pasture. They require drainage before they are suitable for hoed crops and usually their location makes drainage difficult or expensive. A few areas have been cultivated where they adjoin Somerset soils, but these are not large. Natural fertility is low and lime and fertilizers are required for good yields. If economic conditions made it feasible to drain the soils, they would be well suited for agriculture.

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Kentville Series (7,563 acres)

The Kentville soils resemble the Woodville soils in some respects and intermingle with them on undulating to gently rolling land. They differ from the Woodville soils in having finer-textured layers that slow the internal drainage. Hence, the Kentville soils are only moderately well drained and have mottled profiles.

The larger areas of these soils occur around Selfridge Corners and Dempsey Corners and between Kentville and Port Williams. Smaller areas are found around Medford, Kingsport, Canning and Canard.

The soils have developed from reddish-brown to dark-red sandy loam till that has been waterworked. The parent material is slightly plastic and may approach a sandy clay loam in some places. Usually there is not enough surface stone to interfere with agriculture.

Where the soils are forested they support good stands of spruce, maple, poplar and wire birch.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 3	Very dark grayish brown (10YR 3/2) sandy loam; medium, subangular blocky structure; friable; pH 4.7.
Ae	3 – 5	Light-gray (10YR 7/2) loam; weak, medium granular structure; friable; stone-free; pH 4.7.
Bfhgj	5 – 14	Yellowish-brown (10YR 5/6) loam; moderately firm; weak, medium granular structure; prominently mottled with strong-brown and gray streaks; pH 4.9.
Bfgj	14 – 30	Yellowish-red (5YR 5/6) loam; weak, medium, subangular blocky structure; firm; slightly plastic; distinctly mottled; pH 4.8.
C	30+	Dark-red (2.5YR 3/6) sandy loam; very firm; massive; slightly plastic; some mottling; pH 5.3.

The cultivated layer is a dark-brown to dark reddish brown sandy loam. Near Kingsport the B horizon is reddish brown, plastic, gritty, and only faintly mottled. Small areas where the B horizon is a silt loam and the profile is free from stones were also included with these soils. The C horizon is usually very firm.

Use

About 74 percent of the acreage is cleared. The soils are used for a wide range of crops, including hay, grain, potatoes, cash crops and tree fruits. Because of drainage conditions, tree fruits do not grow as well as on the Woodville soils, but beans (Figure 12) and peas are grown on a considerable acreage. The Kentville soils also give good crops of hay and grain. In wet years, cash crops may yield poorly on the more nearly level areas because of excessive moisture.

The soils are acid and require lime and fertilizer for good yields. A good supply of organic matter is necessary also.

Annapolis Series (533 acres)

The Annapolis soils occur on only a very small area in the County, on nearly level to undulating land in association with Bridgetown soils. They have developed from a reddish-brown or dark reddish brown sandy loam till similar to the parent material of the Bridgetown soils.

Figure 12—Beans are grown as a cash crop on the Kentville soils.

Though the surface drainage is moderately good, the internal drainage is imperfect because of a firm to compact subsoil, and the more level areas the soils may be moist near the surface for considerable periods.

Usually the surface is moderately to very stony. The main trees are spruce, fir, tamarack, red maple, wire birch and poplar.

The profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 8	Dark-brown (5YR 4/2) sandy loam; friable; numerous roots; pH 4.2.
Bfhgj	8 – 20	Brown (7.5YR 4/4) sandy loam; fine and medium, sub-angular blocky structure; friable; some granite stones; distinct yellowish-brown and reddish-brown mottling; pH 4.8.
C	20+	Dark reddish brown (5YR 3/4) gravelly sandy loam; firm to compact; numerous stones of granite, slate, trap, and sandstone; mottled; pH 5.2.

Under forest the surface (L-H) layer is black, semidecomposed organic matter about 3 inches thick and is underlain by a dark-gray or pinkish-gray Ae horizon 2 to 3 inches thick. These are worked into the upper part of the B horizon by cultivation.

Use

About 70 percent of the acreage in the County has been cleared and used chiefly for hay and pasture. Vegetables are grown on small acreages and do well in dry years, but drainage needs to be improved for best results with these crops. In addition to drainage, these soils require about the same management practices as the Bridgetown soils.

Roxville Series (1,446 acres)

The Roxville soils occur on the North Mountain in association with the Rossway soils. They are found on nearly level areas where the bedrock is close

to the surface, or on long slopes where seepage water keeps the soils moist for considerable periods. They have developed from parent material similar to that of the Rossway soils.

The surface drainage is usually adequate, but the internal drainage is slowed by the bedrock.

Most of the soils are shallow, but there is not a large amount of stone on the surface. Most areas are covered with forest consisting of spruce, maple, wire birch and alder.

The profile of a typical soil under pasture is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 6	Very dark grayish brown (10YR 3/2) loam; medium granular structure; numerous roots; somewhat greasy; pH 5.2.
Bfhgj1	6 – 12	Dark grayish brown (10YR 4/2) sandy loam; weak, medium, subangular blocky structure; friable; faint yellowish-brown mottling; some stones; pH 5.3.
Bfhgj2	12 – 20	Brown (10YR 4/3) sandy loam; massive; friable; prominent strong-brown mottles; some stones; PH 5.4.
C	20+	Dark-brown (7.5YR 4/2) sandy loam; firm; massive; slightly mottled; pH 5.4.

Under forest the L-H horizon is black, semidecomposed, very fibrous and felty organic matter about 3 inches thick. It is underlain by an Ae horizon of pinkish-gray or gray sandy loam 2 to 3 inches thick. The C horizon may be olive brown where the till is deeper than described above or may have a reddish-brown cast where the soils occur near Glenmont soils.

Use

Only about 10 percent of the acreage has been cleared. These areas are used chiefly for pasture. Shallowness and drainage are the main problems that make them generally unsuitable for cultivated crops. When the trees are removed the soils are suitable for pasture. There are a few areas with favorable topography and depth that could be used for crop land, but these are not generally large enough for commercial use.

Danesville Series (251 acres)

The Danesville soils occur in one small area in the southern part of Kings County. They cover large areas in some other counties, particularly those along the south coast of the province. They intermingle with the Halifax soils, being found on the more nearly level areas of the undulating to rolling land.

They have developed from a stony sandy loam till containing much quartzite rock.

The surface drainage is usually adequate but movement of water through the soil is impeded by the compact subsoil. Usually the surface has enough stones to make clearing uneconomical.

The soils are well adapted to forest. In the better-drained areas the main trees are spruce, maple, hemlock, fir and birch. Where the soils are moist for long periods the main ones are black spruce and tamarack.

A profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	3 – 0	Black, semidecomposed organic matter; greasy mor; fibrous; pH 3.5.
Ae	0 – 3	Light-gray (10YR 7/2) sandy loam; weak, medium granular structure; friable; faintly mottled; pH 3.8.
Bfhgj	3 – 10	Strong-brown (7.5YR 5/6) sandy loam; weak, medium granular structure; slightly firm; distinct yellowish-brown mottles; some stone fragments; pH 4.8.
Bfg	10 – 19	Yellowish-brown (10YR 5/4) sandy loam; moderate, coarse granular structure; firm; distinct, coarse strong-brown mottles; stone fragments; pH 5.0.
C	19+	Olive (2.5Y 4/4) gravelly sandy loam; massive; firm; distinct, coarse mottles; considerable stone; pH 5.2.

The mottling in the profile varies with the rate at which the water moves through the soil. In some sites the upper B horizon is dark brown and may be weakly cemented.

Use

The Danesville soils in Kings County are not suitable for agriculture. They are very stony and are not near the settled areas. In other counties, some areas have been cleared and provide good pasture when limed and fertilized.

Bayswater Series (541 acres)

The Bayswater soils are found near Gibraltar soils, on more slowly drained areas. The acreage in the County is small.

They have developed from a gravelly sandy loam till derived mainly from granite, and occur on undulating to depressional land. They are coarse-textured, but drainage is slowed by the compact subsoil or the relief. There are many granite boulders on the surface.

All the acreage in the County is forested, the trees being mainly spruce, fir, hemlock, maple, wire birch and alder.

A profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	4 – 0	Black, semidecomposed organic matter; greasy mor; pH 3.8.
Ae	0 – 4	Pinkish-gray (7.5YR 6/2) coarse sandy loam; single-grained; friable; some spots of organic staining; granite fragments; pH 4.2.
Bfhgj	4 – 10	Dark reddish brown (2.5YR 3/4) coarse sandy loam; firm; weakly iron-cemented; distinct yellowish-brown mottles; pH 4.8.
Bfg1	10 – 18	Strong-brown (7.5YR 5/6) sandy loam; firm; single-grained; prominent yellowish-brown and dark-brown mottles; some stones; pH 5.0.
Bfg2	18 – 26	Yellowish-brown (10YR 5/4) sandy loam; firm; massive; distinct dark-brown and yellowish-brown mottles; numerous stones; pH 5.2.
C	26+	Pale-brown (10YR 6/3) sandy loam; very firm; yellowish-brown mottles; stones and gravel; pH 5.2.

The upper B horizon ranges from yellowish brown to very dark brown. It is usually weakly cemented and is high in organic matter. In some places the surface layer may be peaty and about 8 to 10 inches thick.

Use

None of the Bayswater soils in Kings County are suitable for agriculture and they should be left in forest.

Masstown Series (1,024 acres)

The Masstown soils occur on poorly drained sites in association with Woodville, Berwick, Glenmont and Somerset soils. They are usually found on nearly level or depressional areas where water accumulates and the soils are saturated for much of the year. The larger areas are near Berwick and on the North Mountain north of Viewmount.

The soils have developed from a red to dark-red sandy loam till that is firm to compact and restricts water movement. The amount of stone on the surface varies widely, depending on the area and the surrounding soils.

The trees found are mainly black spruce, tamarack, poplar, red maple and alder.

A profile typical of a soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L - H	4 - 0	Black, semidecomposed organic matter; H layer moderately thick and well decomposed; pH 4.0.
Aeg	0 - 7	Grayish-brown (10YR 5/2) coarse sandy loam; single-grained; distinct yellowish-brown mottles and organic staining; pH 4.5.
Bfg	7 - 17	Yellowish-red (5YR 4/8) sandy loam; friable; coarse granular structure; prominent grayish-brown (10YR 5/3) and red mottles; mottles redder at junction of Aeg and Bfg horizons; no stones; pH 5.0.
C	17+	Dark-red (2.5YR 3/6) coarse sandy loam; massive; firm; faint mottling; pH 5.3.

The surface layer may develop a thick Ah horizon of dark grayish brown silt loam from fine material washed into the depressions from the surrounding land. In some places the Bfg horizon may be divided into an upper yellowish-red and a lower reddish-brown layer. Where these soils are very poorly drained the colors are dull and mottling is very prominent.

Use

The Masstown soils are used little because of their locations and poor drainage. Only a small acreage has been cleared and is used for pasture. Where drainage is possible and the surface is not too stony, the soils should be suitable for hay and grain.

Tiddville Series (209 acres)

The Tiddville soils are found on a very small area in the County, but on considerable areas in other counties. They occur in depressional areas near Rossway and Roxville soils.

Because of their locations and shallowness they are saturated with water for long periods. Usually the surface is stony.

Most of the soils are under forest, the main trees being black spruce, fir, red maple, ash, poplar and alder.

A profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L - H	6 - 0	A thin layer of moss (L layer) over black (5YR 2/1), decomposed organic matter (H layer); greasy; numerous roots; pH 3.8.
Aeg	0 - 4	Dark-gray (5YR 4/1) loam; faint yellowish-brown mottles; impregnated with organic matter; porous; greasy; pH 4.0.
Bfhg	4 - 18	Dark-brown (7.5YR 4/2) sandy loam; massive; prominent yellowish-brown and red mottles; fragments of trap rock; pH 4.8.
Cg	18+	Dark-brown (7.5YR 4/2) sandy loam; massive; firm; less mottling than in horizon above; some stones; pH 5.0.

This profile is underlain at 24 inches by bedrock. Where the till is deeper the C horizon may be olive brown and two B horizons may be distinguished. The very poorly drained sites grade into shallow bogs.

Use

The Tiddville soils in Kings County are not suitable for cultivation.

Aspotogan Series (4,760 acres)

The Aspotogan soils occur in scattered small areas in the southern part of the County. They are found near Gibraltar and Halifax soils, on nearly level to depressional areas where drainage is poor because of topography and shallowness to bedrock.

They have developed from a stony sandy loam till derived largely from granite and quartzite. They are very stony on the surface and are almost entirely covered with forest — mainly maple, spruce, tamarack and alder.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L - H	10 - 0	Thick moss underlain by semidecomposed organic matter; fibrous; greasy mor; pH 3.8.
Aeg	0 - 8	Dark-gray (10YR 4/1) sandy loam; single-grained; prominent dark grayish brown (10YR 4/2) mottles; pH 4.2.
Bfhg	8 - 14	Very dark grayish brown (10YR 3/2) sandy loam; weak, medium granular structure; moderately firm; prominent yellowish-brown mottles; pH 4.8.
Bfg	14 - 24	Dark-brown (2.5YR 3/2) sandy loam; moderate, fine granular structure; many prominent strong-brown mottles; firm; some stones; pH 5.0.
Cg	24+	Light olive gray (5Y 6/2) sandy loam; very firm; massive; distinct yellowish-brown mottles; stony; pH 5.2.

The solum averages about 18 inches deep. The dark-colored B horizons are a common feature of these soils. Occasional granite boulders occur in the profile. In a few places, where the soils dry out for part of the year, the upper B horizon may be weakly cemented. Mottling usually takes the form of irregular splotches and patches.

Use

The Aspotogan soils are too stony and wet for agriculture. Where drainage is very poor they are not well suited for forest and support a stunted growth of black spruce. Their best use at present is for forest.

Soils Developed from Coarse-textured Parent Materials

These soils have developed on sands and gravels deposited by glacial streams in the form of kames, eskers, terraces, outwash plains and floodplains. They occupy about 10 percent of the land area of the County. About 83 percent of this area is covered by the well-drained series Cornwallis, Canning, Nictaux, Torbrook and Gulliver. The remaining series, Kingsport and Millar, are imperfectly and poorly drained respectively. Nearly 40 percent of the total acreage is cleared and agricultural use is limited chiefly by poor drainage or topography. The well-drained soils are usually droughty and may require irrigation for satisfactory yields.

Cornwallis Series (18,950 acres)

The Cornwallis soils (Figure 13) occupy nearly 4 percent of the County. They occur mainly on the Valley floor in two large areas, one from Kentville to west of Waterville and the other from the western boundary of the County to near Greenwood.

They have developed from yellowish-red to yellowish-brown sand. The ratio of coarse to fine sand in the parent material varies somewhat, and affects the water-holding capacity. The drainage ranges from moderately rapid to excessive.

The land ranges mainly from nearly level to rolling, a few areas having steep slopes and hummocks. The soils are largely free from stones.

The forested areas are covered with pine, wire birch and poplar.

A profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L–F	2 – 0	L layer mainly needles and moss; F layer black (5YR 2/1), felty, semidecomposed litter; pH 4.3.
Ae	0 – 7	Gray (5YR 6/1) sand; single-grained; loose; pH 4.2.
Bfh	7 – 15	Yellowish-red (5YR 4/6) medium sand; single-grained; very friable; some roots; pH 5.0.
Bfhcj	15 – 24	Dark reddish brown (5YR 3/4) fine sand; firm; weakly cemented with iron and organic matter; massive; pH 5.1.
C1	24 – 30	Reddish-brown (5YR 4/4) fine sand; loose; single-grained; pH 5.0.
C2	30+	Reddish-brown (5YR 4/4) fine sand; single-grained; very friable; pH 5.1.

In general, the lower horizons are not as reddish as described above except where the soils merge into Canning soils. The upper B horizon is usually only one to three inches thick and not cemented and the lower B and C horizons are friable to loose, yellowish-red to yellowish-brown sand. Lenses of finer sand may occur in the profile. Near Medford Beach there is gravel in the profile and the parent

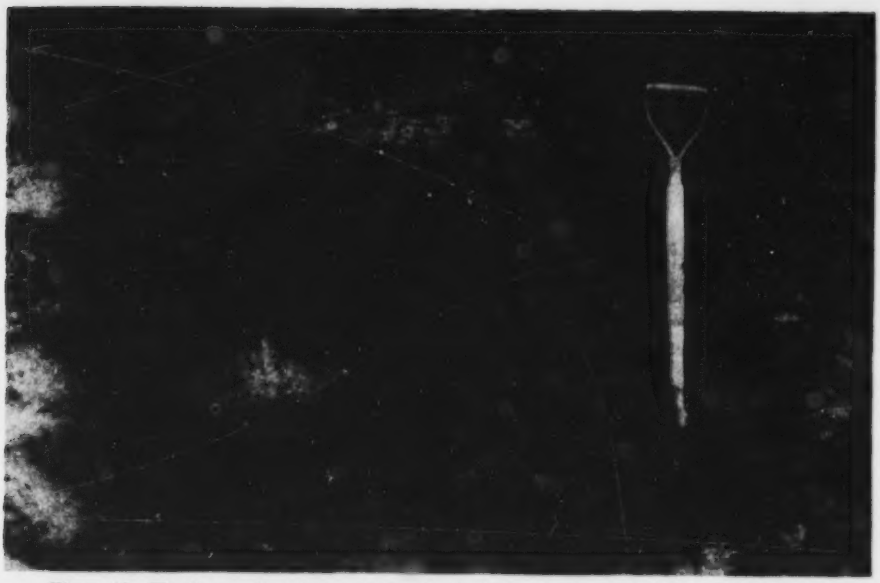

Figure 13—The Cornwallis soils are strongly leached, deep loamy sands. Some of the finer-textured areas are used for crops, but most areas are droughty.

materials were deposited as a delta. Much of the series west of Aldershot is a loamy sand or loamy fine sand, but north of Cambridge and along the highway west of Kentville the soils are moderately coarse. The soils are not generally as fine-textured as the Canning soils or as red.

Use

The Cornwallis soils are droughty, and for cropping they need to have organic matter added and usually must be irrigated. They also require lime and fertilizers. They have been used for hay, grain, potatoes, cash crops and tree fruits. Orchards are unprofitable because the soils are porous and droughty. The soils are easily cleared and cultivated, and with adequate moisture and fertilization they give good yields of field crops. Usually the cost of maintaining these conditions is not warranted when other soils are available, and wide use of the soils for agriculture must await economic conditions that make it profitable to cultivate them. Only 44 percent of the acreage has been cleared.

Canning Series (3,948 acres)

The Canning soils, found on the northern side of the Valley, resemble the Cornwallis soils but are redder and generally finer in texture. They are not extensive in the County. The largest area occurs north of Sheffield Mills between Woodside and Centreville. Smaller areas are found near Habitant, Kingsport and Upper Pereau and between Lakeville and Brooklyn Corners.

They have developed from red fine sand on mainly undulating to rolling land. Some areas are hummocky and have steep slopes. The drainage is rapid, but

the soils hold moisture better than the Cornwallis soils. Where the Canning soils intermingle with Woodville and Somerset soils, they have a coarser texture and are droughty.

The soils are practically stone-free and are easily cleared. The main trees found are pine, wire birch, spruce and poplar.

A profile of a typical soil under pasture is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 - 3	Dark reddish brown (5YR 3/3) loamy fine sand; soft, fine granular structure; pH 4.4.
Ae	3 - 6	Pinkish-gray (5YR 7/2) loamy fine sand; moderate, fine granular structure; very friable; pH 4.8.
Bfh1	6 - 16	Yellowish-red (5YR 4/6) loamy fine sand; granular structure; friable; pH 5.0.
Bfh2	16 - 26	Dark-red (2.5YR 3/6) loamy fine sand; friable; pH 5.3.
Bf	26 - 30	Dark-red (2.5YR 3/6) fine sand; moderately friable; pH 5.4.
C	30+	Red (2.5YR 4/6) fine sand; moderately firm; pH 5.5.

In a few places the upper B horizon may be weakly cemented and some gravel is present in the lower horizons. The cultivated layer is reddish-brown fine sandy loam. Around Upper Pereau and Norths the upper part of the profile resembles that of the Woodville soils, but is underlain by a red, loamy coarse sand.

Use

Although the Canning soils hold moisture better than the other outwash soils near them, they are droughty. Hay and pasture stands are often very thin. Deep-rooted crops and fruit trees get moisture from the deeper layers, so that some good orchards are found. The moisture supply at lower depths is probably enhanced by seepage from the nearby North Mountain. For profitable yields of most crops, however, organic matter must be added through manuring or plowing down cover crops, and lime and fertilizers applied. For cash crops it is often profitable to irrigate and this practice is becoming more common. Nearly all the acreage has been cleared and is used for pasture, cash crops, tree fruits and tobacco.

Nictaux Series (9,752 acres)

The Nictaux soils are coarser in texture than the Cornwallis and Canning soils and are found along the south side of the Valley floor from Kentville to west of Auburn. The largest area occurs between Aylesford and Auburn. Some small areas occur around Lake George and Aylesford Lake.

The soils have developed from coarse sand or stratified coarse sand and gravel and the profile resembles that of the Cornwallis series. The drainage is very rapid to excessive and the soils are droughty.

The land ranges from nearly level to strongly rolling and steeply sloping.

A few areas have considerable stone on the surface, but most of the acreage is largely free from surface stones.

Where the soils are forested the main trees are pine, wire birch, spruce and juniper.

Figure 14—Nictaux loamy sand, showing the strongly cemented B horizon

A profile typical of a forested soil is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	2 – 0	Black, semidecomposed organic matter; layer thin; greasy mor; pH 4.3.
Ae	0 – 9	Reddish-gray (5YR 5/2) coarse sand; single-grained; some fine gravel; loose; very porous; pH 4.2.
Bfhc	9 – 18	Yellowish-red (5YR 4/6) gravelly coarse sand; single-grained; weakly to strongly cemented; pH 5.0.
Bfhcj	18 – 36	Yellowish-red (5YR 4/8) course sand; single-grained; weakly cemented; no roots; pH 5.4.
C	36+	Reddish-brown (5YR 4/4) medium and coarse sand; moderately loose; stratified; pH 5.3.

The cultivated layer is very low in organic matter and the clay content is usually below 5 percent. Some areas have considerable gravel in both the plowed layer and the subsoil and the gravel may range from coarse, cobbly material to very fine stones.

In many locations the soils are not as red as described above and the lower horizons may be yellowish brown, but there is a reddish cast on all of the soils. The Ae horizon may range in thickness from two inches in one profile to a foot in another location and it has tongue-like projections into the B horizon. Much of the acreage has a cemented B horizon (Figure 14). This hardpan may be a continuous layer over a fairly large area or it may be intermittent to spotty. The cultivated layer is usually dark grayish brown sandy loam but may range to a coarse loamy sand.

Use

The Nictaux soils are very droughty and their suitability for agriculture depends on improvement of their moisture-holding capacity by maintaining an adequate supply of organic matter or on availability of irrigation facilities. The soils are so coarse and porous that both of these practices are costly. There are a few areas of finer texture that have been used for vegetables and tree fruits. Yields are usually low unless the moisture supply is adequate.

The soils are acid and are low in natural fertility. Hence, for satisfactory yields they require lime and fertilizers. These are rapidly leached out of the solum so that very careful management is needed. Nearly a third of the acreage is too stony or too steep for agriculture.

Torbrook Series (12,330 acres)

The Torbrook soils occur along the lower slopes of the South Mountain throughout the County. The larger areas are near New Minas, around Tremont and East Tremont and between Factorydale and Morristown. Smaller areas occur in the Gaspereau Valley, around Coldbrook and near Prospect.

They have developed from coarse-textured water-deposited sands and gravels derived mainly from shales and slates with some granite and quartzite. This material was deposited as terraces and deltas. The parent material is poorly sorted and areas of deep sand may intermingle with areas of roughly stratified sand and gravel. Gravel layers may appear on the surface, underlain by sand lenses.

The land ranges from nearly level areas to hummocky mounds with steep slopes.

The drainage is rapid because of the topography and the porosity of the parent materials. On the more nearly level terraces the soils usually contain more fine material than those on the hummocky mounds and hold moisture slightly better, but in seasons of low rainfall all of the soils are droughty.

Generally there are not enough surface stones to interfere with cultivation, but the rougher areas are more stony on the surface.

The trees found are spruce, hemlock, maple, birch, pine and some oak.

A profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	2 – 0	Black, semidecomposed organic matter; loose; fibrous; greasy mor; pH 4.6.
Ae	0 – 3	Light brownish gray (10YR 6/2) sandy loam; fine granular structure; friable; pH 4.3.
Bfh1	3 – 10	Yellowish-brown (10YR 5/8) loamy sand; numerous shale fragments; friable; porous; weakly cemented in spots; pH 4.2.
Bfh2	10 – 18	Brown (10YR 4/3) gravelly loamy sand; very friable; gritty; pH 4.6.
C	18+	Yellowish-brown (10YR 5/6) and reddish-brown (5YR 4/4) sand and gravel; slate, granite and quartzite fragments and stones; variable in texture; pH 5.2.

In some sites the B horizons may be yellowish red and the soils may overlie reddish-brown till at 3 to 5 feet, but usually the deposits are very thick.

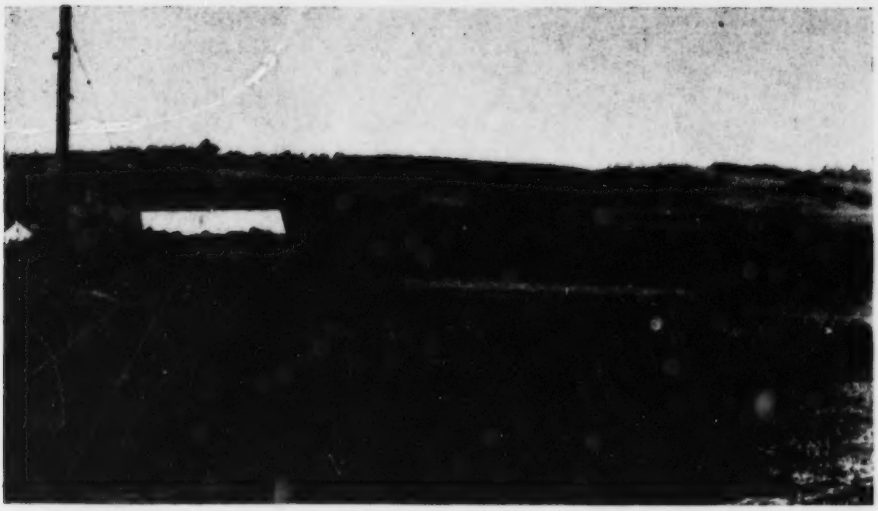

Figure 15—The smoother areas of Torbrook soils (foreground) are used for orchards. The Wolfville soils (background) are also used for orchards.

Use

The more nearly level or gently sloping areas of Torbrook soil (Figure 15) have been used for hay, grain, vegetables and tree fruits. Some of these areas are near stream channels or are underlain by till at depths of 3 to 8 feet and hold moisture somewhat better than most others in the series. In many areas the topography is unsuitable for using farm machinery and this, along with droughtiness, limits their use for agriculture.

Where they are cultivated, the Torbrook soils require careful management. Lime and fertilizers and a good supply of organic matter are needed for high productivity, and maintaining these conditions is costly because the soil leaches rapidly. Most areas are better suited to forest.

Gulliver Series (738 acres)

The Gulliver soils occur on a small acreage in the County. They are found only along the Bay of Fundy coast, the largest area being at Scotts Bay. They generally lie on nearly level to sloping terraces or on beaches now abandoned by the sea. Some of the areas are cut by streams.

The soils have developed from gravelly material derived largely from the underlying basaltic rock and in profile they resemble the Rossway soils, but are more gravelly. The drainage is moderately rapid, but the soils generally contain more fine material and hold moisture better than the other water-deposited soils in the County.

There is not usually enough surface stone to interfere with cultivation.

Where they are forested the soils are covered with spruce, maple, birch, poplar and alder.

A profile of a typical soil under cultivation is described as follows:

Horizon	*Depth Inches*	*Description*
Ap	0 – 8	Dark grayish brown (10YR 4/2) loam; moderate, medium granular structure; friable; pH 4.8.
Bfh	8 – 16	Yellowish-brown (10YR 7/4) gravelly loam; moderate, medium granular structure; moderately firm; numerous roots; pH 5.2.
BC	16 – 28	Light olive brown (2.5Y 5/4) fine gravel; moderately firm; pH 5.5.
C	28+	Olive-brown (2.5Y 4/4) fine gravel; firm; some large cobbles of trap rock; pH 5.5.

The gravel in these soils is derived from basaltic rock and breaks down into pea-size fragments.

The B horizon may be dark reddish brown (5YR 3/3) and is moderately high in organic matter. At depths of 3 to 5 feet the gravel becomes coarse and cobbly. Organic staining is common throughout the profile, and where drainage is slightly restricted the lower B horizon may be weakly cemented in spots.

Use

These soils have been cultivated mainly in the Scotts Bay area, where they are used mainly for potato growing but also for hay, grain and pasture. These areas are highly suited for potatoes. Elsewhere their use is limited by their small acreage or steep slopes. They respond well to lime and fertilizers. Care is needed to prevent erosion on the steeper slopes.

Kingsport Series (6,165 acres)

The Kingsport soils occur near Cornwallis, Canning and Nictaux soils, on areas where drainage is poor because of the relief or a slowly permeable subsoil. They have developed from coarse-textured alluvium and are found on nearly level to gently undulating land. The larger areas occur north of Berwick, around Lakeville and southwest of the village, and between Waterville and Grafton. Smaller areas are scattered throughout the Valley floor. Most of them are imperfectly drained (Figure 16) but are dry enough to be used during the growing season.

The soil is largely free from surface stones except that an area east of Dempsey Corners is very stony.

The trees found are black spruce, balsam fir, tamarack, poplar and alder.

The profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L – H	3 – 0	Thin moss (L layer) over black, semidecomposed organic matter (F layer); fibrous mor; numerous roots; pH 3.3.
Aegj	0 – 4	Gray (10YR 5/1) loamy sand; weak, medium granular structure; a few distinct dark-brown mottles; friable; pH 3.7.
ABgj	4 – 7	Very dark grayish brown (10YR 3/2) loamy sand; slightly firm; massive; some dark staining; pH 4.2.
Bfhcgj	7 – 17	Yellowish-red (5YR 4/8) coarse sand; firm; cemented with iron and organic matter; faint yellowish-brown mottles; pH 4.8.
Bfgj	17 – 36	Dark-red (2.5YR 3/6) sand; single-grained; moderately firm; very faint mottles; pH 4.7.
C	36+	Dark-red (2.5YR 3/6) fine and coarse sand; firm; no mottling; pH 4.6.

Figure 16—In the Kingsport soils the B horizon is often weakly cemented and splotched with light and dark colors. There is water in the lower part of this profile.

In some of the flatter areas the soils are more prominently mottled than described above and the B horizon is not cemented. Where drainage is poor, the soils grade into the Millar soils. The Kingsport soils may be underlain by clay at depths of 5 to 8 feet. Small areas in which thin clay layers occurred in the profile were included with these soils. Near the larger streams a few areas have a layer of silty clay loam on the surface because of flooding. Where cultivated, the soils have a dark, mucky plowed layer underlain by grayish, mottled coarse sand grading into firm, red sand.

Use

About 45 percent of the acreage has been cleared. These areas are used mainly for hay and pasture. Grain has been grown on some of the better-drained areas. The soils are not suitable for vegetable or cash crops unless drainage is improved. They are very acid and require lime and fertilizers for satisfactory yields. Some of the drier areas are suitable for permanent pasture, but the wetter areas should be left in forest.

Millar Series (3,208 acres)

The Millar soils have developed from poorly drained alluvial sediments and are found near Kingsport, Cornwallis, Canning and Nictaux soils, on level to depressional areas. The larger areas occur west of the Caribou Bog, near Auburn and north of Kingston.

Commonly, the soils rest on beds of lacustrine clay or till, which prevents water from moving downward. In some places the impervious layers are many feet below the surface, but act as a basin to trap water from the higher surrounding land. Most of the soils are saturated with water for much of the year and organic matter accumulates on the surface.

The soils are generally free from stones, but occasional boulders are found. The trees found are black spruce, red maple, tamarack and alder.

A profile of a typical soil under forest is described as follows:

Horizon	*Depth Inches*	*Description*
L	8 – 5	Moss, sedges and leaf litter.
F	5 – 3	Semidecomposed moss and sedge.
H	3 – 0	Black (10YR 2/1), decomposed organic matter; fibrous; greasy mor; pH 4.8.
Aeg	0 – 8	Dark-gray (10YR 4/1) sand; friable; stained and splotched with organic matter; some roots; pH 4.8.
Bg	8 – 19	Yellowish-brown (10YR 5/4) sandy loam; moderately firm; prominent strong-brown and reddish-brown mottles; pH 5.3.
Cg	19+	Gray (10YR 5/1) sand; firm; faint mottling; pH 5.2.

In some places the Bg horizon is gray and the C horizon is light reddish brown. The color varies with the degree of drainage and the location of the soils in relation to the Cornwallis, Nictaux or Canning soils. In some better-drained sites the Millar soils may have a thin Ah horizon.

Use

These soils are unsuitable for cultivation unless they are drained. At present, some of the better-drained areas are used for pasture. Most of the areas are small and it would not be profitable to drain them. A few larger areas, if drained, would be suitable for hay and grain. Because of their locations, the soils have a frost hazard and there would be considerable risk in using them for cash crops.

Soils Developed from Organic Materials

Peat (11,000 acres)

Peat soils occupy about 2 percent of the County and more than 65 percent of this is on the Valley floor. The larger areas occur along the Cornwallis River west of Kentville, north of Coldbrook, near Aylesford and south of Auburn. Smaller areas are scattered throughout the County, particularly in the southern part.

These soils occur in depressions where moisture is excessive for most of the year. The depressions are now filled with partly decomposed remains of water-loving plants such as sedges, reeds, moss and, occasionally, trees. The surface is usually covered with a thick layer of sphagnum moss and and other plants such as labrador tea, crowberry, lambkill, bog rosemary and cotton grass. The trees found are black spruce, tamarack, red maple and alder. Some of the larger bogs are treeless.

Generally, the surface layer of these soils consists of 12 to 20 inches of sphagnum moss and sedges. This is underlain by poorly decomposed material of the same kind. The deposits range from about two to several feet deep and overlie mineral soil.

In a few areas the surface layers are well decomposed and are practically muck. Some cash crops have been grown experimentally on these areas and seem to do well, but require careful management for an adequate supply of nutrients.

The large Caribou Bog near Aylesford has been developed as a source of horticultural peat. Other small areas, where the peat is shallow over mineral soil, have been developed for growing cranberries. Most of the peat areas in the southern part of the County are unsuitable for use at present.

Miscellaneous Land Types

In some areas of the County soils have not had a chance to develop because of frequently changing conditions or lack of materials. Areas like salt marsh, coastal beach, and rocky and eroded land are in this group. They occupy about 4 percent of the County and have little or no agricultural value at present.

Salt Marsh (2,942 acres)

The areas mapped as salt marsh are periodically flooded by tidal waters, which deposit sediments on the surface. The larger areas occur at the mouths of the Habitant, Canard and Cornwallis rivers in association with the Acadia soils. The Acadia soils were formerly salt marsh but were dyked and drained.

The soil materials of the marshes are reddish-brown sediments of a silty clay loam texture. The periodic washing and deposition of these sediments by the tides keep horizons from developing.

There are no stones in the sediments but grasses and sedges are trapped in the underlying layers. The surface vegetation consists of salt-tolerant grasses, sea blite and spurrey.

At present the marshes are used little for agriculture. Some of the drier areas are used for pasture and sometimes the natural grasses are cut for bedding.

Rocky Land (6,800 acres)

Areas mapped as rocky land include rock outcrops and shallow soils where bedrock is exposed on more than 60 percent of the surface. Except for one area near Blomidon, rocky land occurs mainly in the southern part of the County, the largest area lying along the boundary of Lunenburg County. Soils in these areas are very shallow and the surface is very stony. Drainage ranges from good to poor, depending on the angle of the bedrock.

These areas are not suitable for agriculture. They have some value for forestry where the soil is deep enough for tree roots to gain a foothold, but most areas have a shrubby growth.

Coastal Beach (95 acres)

Coastal beaches are areas along the coastline where sand and gravel have been deposited by waves. A sloping strip of sand or sand and gravel next the water is bounded on the landward side by coarse cobbly gravel. The largest area of coastal beach in the County is found at Scotts Bay. The beaches have no agricultural use, but are sites for recreation. Some of the gravel may be used for road construction.

Eroded Land (11,903 acres)

This land consists of severely eroded stream banks and gullied land unsuitable for agriculture. Forest cover can and should be maintained on many of these areas. Some of the areas have good forest cover now.

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LAND USE

Land in Kings County has been cultivated since the early part of the 16th century. The natural features of the Annapolis–Cornwallis Valley, protected from winds on both sides by mountains and containing soils easy to clear and cultivate, ensured the early development of one of the best agricultural areas of the province. Fruit growing (Figure 17) and dairying soon became the major uses of the land. More recently, because of economic conditions, some soils were found to be better suited to crops other than tree fruits. Hence, there has been a marked trend toward growing canning crops (Figure 18), small fruits, and tobacco. This trend will probably continue.

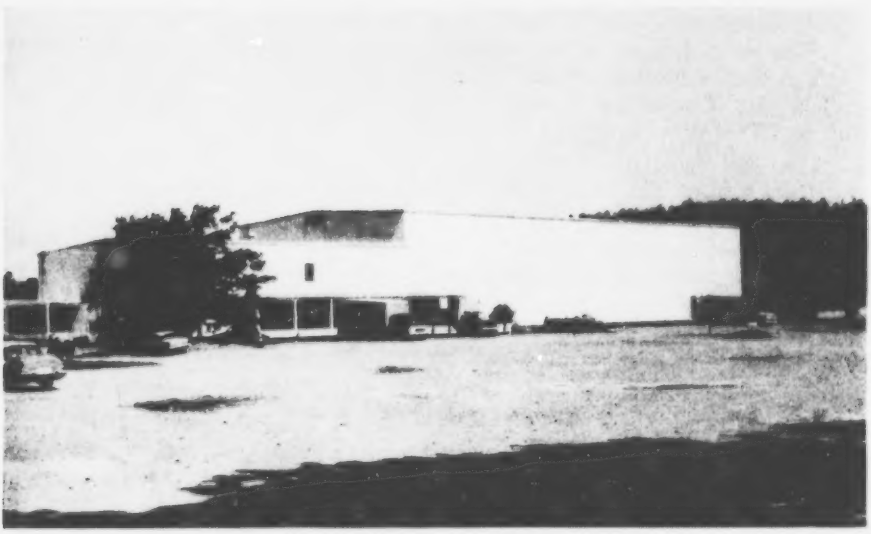

Figure 17—Large storage plants are necessary for efficient handling of the apple crop.

At present, the 1,308 farms in the County occupy about 40 percent of the land (Table 5). About 38 percent of the area in farms is improved. There is a wide range in the size of farms: 54 percent of them have less than 150 acres,

Table 5.—Acreages and Uses of the Farm Land, 1961

Total land area	526,974
Number of farms	1,308
Area in farms	207,899
Average area per farm	159
Improved land	77,763
Crops	56,050
Summerfallow	626
Pasture	16,035
Other	5,052
Improved area per farm	59
Unimproved land	130,136
Woodland	84,366
Other	45,770

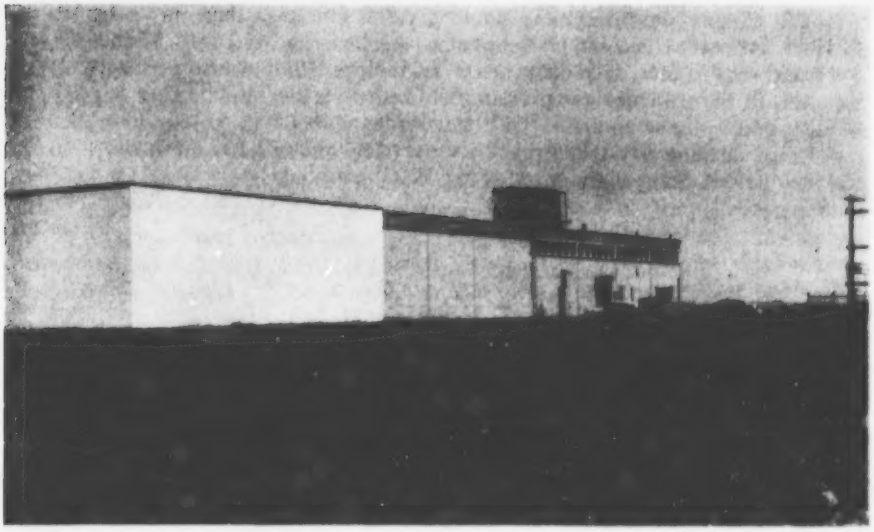

Figure 18—A modern freezing plant for canning crops at Hillaton.

25 percent from 70 to 130 acres and about 38 percent from 130 to 400 acres. There are three farms over 760 acres. The average size is 159 acres, with an average of 59 acres improved. Nearly 21 percent of the improved land is used for pasture and 7 percent for purposes other than crops. Between 1956 and 1961 the area of land in farms decreased by nearly 42,000 acres.

Hay is grown on about half of the crop acreage in the County (Table 6). Tree fruits (18 percent) and grain (17 percent) are grown on most of the remainder. Potatoes, canning crops, small fruits, tobacco, and home gardens (11 percent) are important sources of revenue in the County despite their small acreages.

Table 6.—Acreages in Field Crops, 1961

All field crops	56,050
Hay	28,860
Oats cut for hay	420
Tree fruits	10,128
Grain	9,430
Wheat	121
Oats	7,129
Mixed grain	1,547
Rye	487
Barley	146
Potatoes	3,546
Vegetables	2,215
Fodder crops	615
Small fruits	296
Turnips, swedes, mangels	263
Tobacco	67
Other	210

The County produces more poultry, cattle and pigs than any other in the province. About 98 percent of the poultry are hens and chickens (Table 7), the rest being small flocks of turkeys, geese and ducks. Most of the poultry and eggs produced in the province come from the County. Some farmers find it profitable to raise poultry in conjunction with fruit growing.

Dairy farming is an important industry and the County ranks third in the province in this occupation. Most of the dairy herds are maintained on the finer-textured soils.

Table 7.—Numbers of Livestock in the County, 1961

Poultry	937,561
Hens and chickens	926,852
Turkeys	110,455
Geese	192
Ducks	62
Cattle	24,943
Cows and heifers for milk production	8,883
Steers (1 year and over)	3,537
Pigs	10,550
Sheep	4,740
Horses	744

The large areas of dykeland make excellent pasture for beef cattle and other livestock and recently the number of beef cattle has increased.

Besides being one of the leading agricultural areas of the province, the County derives considerable revenue from its forests. In 1961 it ranked third in the province in the value of forest products. Productive forest covers about 60 percent of the land area of the County (Table 8) with almost equal percentages of softwood (51 percent), largely spruce, balsam fir and hemlock; and hardwood (48 percent), mostly birch and maple.

Table 8.—Square Miles of Various Forest Resources, 1958[1]

Productive forest	307
Softwood	262
Mixed wood	242
Hardwood	3
Depleted forest	30
Nonforest and nonproductive	35
Total	572

[1]Hawboldt, L. S., and R. M. Bulmer. The forest resources of Nova Scotia. Nova Scotia Department of Lands and Forests. 1958.

Nearly all farms have electric power and more than 60 percent of the farmers have one or more tractors. The larger dairy farms are equipped with milking machines and refrigeration facilities.

Though some crops are grown on nearly all the soils of the area, some soils, because of their properties, are preferred for certain crops. Tree fruits are grown largely on the Woodville, Pelton, Canning, Berwick, Wolfville and Morristown series. Small fruits are grown chiefly on the Canning, Pelton, Somerset, Woodville and Kentville series. Canning crops such as peas and beans, and potatoes and other vegetables are grown largely on the Woodville, Berwick, Somerset and Canning series.

Soil Capability Classes

The use of land for agriculture depends on the physical factors that limit its use for crops or pasture. The land must be of such area and shape that farm machinery can be used to cultivate and harvest the crop. Some soils that are stony, wet, or subject to flooding or erosion may be economically developed for agriculture after these limitations are removed.

In this report the soils are grouped into seven classes, in which the physical factors impose increasingly severe limitations on the use of land for crops. The soils in Classes 1 to 4 are capable of sustained use for cultivated field crops, those in the next two only for perennial forage crops and the last for neither. The classification does not distinguish between land now improved for agriculture and unimproved or virgin land. It is assumed that the soils will be well managed and cropped, under a largely mechanized system. Soils that can be improved by practical means are classed according to their limitations or hazards in use after the improvements have been made. The capabilities of the soils for trees, tree fruits, small fruits, ornamental plants, recreation or wildlife are not considered in the classification.

Each class of soils may be divided into subclasses on the basis of 12 kinds of limitation: adverse climate (c); poor structure and/or permeability (d); erosion (e); low fertility (f); overflow (i); moisture deficiencies attributable to soil characteristics (m); salinity (n); stoniness (p); shallowness to bedrock (r); adverse soil characteristics (s); adverse topography, slope or pattern (t); excess water other than that due to overflow (w).

Each subclass may be divided into textural groups of soils that have nearly similar management requirements.

In the tables accompanying the following discussion, the symbols for topography and stoniness used on the map and the acreage of each soil are shown.

The symbols for topography are:

Symbol	*Topography*	*Slope, %*
A	Level to very gently undulating	0-2
B	Gently undulating to undulating	3-5
C	Undulating to gently rolling	6-9
D	Gently rolling to rolling	10-15
E	Strongly rolling to hilly	16-30

The symbols for stoniness are:

Symbol	*Degree of Stoniness*
0	Stone-free
1	Slightly stony; no hindrance to cultivation
2	Moderately stony; enough stone to interfere with cultivation unless removed
3	Very stony; enough stone to be a serious handicap to cultivation
4	Too stony for cultivation

The severity of the limitations is given in detail in the description of each class.

Soil Capability Class 1

Soils in this class have no important limitations in use for crops. They have level or gently sloping topography, are deep, are well to imperfectly drained and have good water-holding capacity. The soils are naturally well supplied with plant nutrients. They are easily maintained in good tilth and fertility, and damage from erosion is slight. They are moderately high to high in productivity for a wide range of field crops.

There are no soils in Kings County that meet all of these requirements although a few closely approach them.

Soil Capability Class 2

Soils in this class (Table 9) have moderate limitations that reduce the choice of crops or require moderate conservation practices. They have good water-holding capacity and are either naturally well supplied with plant nutrients or are

Table 9.—Textures, Subclasses, Series and Acreages of Soils in Capability Class 2, Those with Moderate Limitations

Texture	Subclass	Soil series[1]	Topography and stoniness phase	Acres
Moderately fine	s	Wolfville	B-1	440
			B-2	577
			C-0	4,077
			C-1	901
			C-2	1,362
		Hantsport	B-0	272
			C-0	200
			C-1	359
				8,188
Medium	s	Pelton	A-0	223
			B-0	2,940
			C-0	5,531
	i	Stewiacke	A-0	360
	c	Cumberland	A-0	447
			A-1	37
				9,538
Moderately coarse	s	Berwick	A-0	201
			B-0	5,193
			B-1	2,585
			B-2	986
			C-0	1,235
			C-1	334
			C-2	423
	s	Woodville	A-0	618
			B-0	7,845
			C-0	6,035
	s	Somerset	A-0	330
			B-0	92
	s	Kentville	B-0	4,247
			B-2	180
			C-0	1,891
	s	Debert	B-0	667
			B-1	226
				33,088
Total area (Class 2)				50,814

[1]See definitions on page 95.

highly responsive to fertilizer. They are moderately high to high in productivity for a fairly wide range of crops. The limitations are moderate and the soils can be managed and cropped with little difficulty.

The limitations include one or more of the following: adverse climate, undesirable soil characteristics, low fertility, poor structure or permeability, erosion, adverse topography, overflow, and wetness.

These soils occupy nearly 10 percent of the County and most of the crops are grown on them. Simple management practices are usually sufficient to keep the soils productive. The land ranges from nearly level to undulating and there is not enough stone to interfere with cultivation. The fine-textured series Woodville and Hantsport, which occupy about 16 percent of the acreage in this class, are somewhat better suited to hay and forage crops than the coarser-textured series. The medium-textured series Stewiacke and Cumberland are stone-free and have fair natural fertility but they are subject to seasonal flooding and have a frost hazard for tender crops. Hay and grain are the main crops grown on these soils at present. The coarser-textured soils make up 65 percent of this class and are suitable for a wide range of crops, but particularly those that require a short rotation. Maintenance of organic matter and fertility is the main management problem.

Soil Capability Class 3

Soils in this class (Table 10) have moderately severe limitations that reduce the choice of crops or require special conservation practices. They have more severe limitations than those in Class 2. These limitations affect one or more of the following farm practices: timing and ease of tillage, planting and harvesting; choice of crops; and application and maintenance of conservation practices. However, they are medium to moderately high in productivity for a range of crops.

The limitations include one or two of the following: adverse climate, undesirable soil characteristics, low fertility, low available soil moisture, poor structure or permeability, salinity, erosion, adverse topography, overflow, wetness, stoniness, and shallowness to bedrock.

The soils in this class occupy about 19 percent of the land in the County. They are generally found on undulating to gently rolling land but some areas may have short steep slopes. The moderately fine- and medium-textured soils are used chiefly for hay and grain or tree fruits. Some of the Morristown soils are used for cash crops. These soils are slow to warm up in the spring. The soils with D slopes are subject to considerable erosion when cultivated and should be kept in sod as long as possible. The Cumberland soils in this class tend to be droughty, or frost hazard limits appreciably the range of crops that can be grown successfully.

The moderately coarse- and coarse-textured soils are generally limited in use by droughtiness, shallowness, or numerous stones in the profile that make cultivation difficult and retard the growth of root crops. The Glenmont soils are well suited to a fairly wide range of crops but the bedrock outcrops frequently, giving rise to deep and shallow areas even in a single field. Kentville and Debert soils receive moisture from surrounding higher land and are usually late in the spring. They may produce very good crops in dry years. Kingsport soils have a cemented B horizon that tends to hold the moisture on the surface and also restricts the spread of plant roots. The coarse-textured series Canning, Torbrook and Gulliver hold moisture poorly and need organic matter to make them productive. Irrigation is sometimes used on these soils.

Table 10.—Textures, Subclasses, Series and Acreages of Soils in Capability Class 3, Those with Moderately Severe Limitations

Texture	Subclass	Soil series	Topography and stoniness phase	Acres
Moderately fine	s	Middleton	B-0	718
			C-0	1,076
			C-1	571
			D-2	1,087
	s	Fash	A-0	87
	s	Acadia	A-0	8,470
	s	Wolfville	B-1	526
			B-2	323
			C-1	355
			C-2	446
	t		D-0	513
			D-1	552
				14,824
Medium	s	Morristown	B-0	471
			B-1	375
			B-2	10,474
			C-1	3,120
			C-2	10,574
	t		D-1	2,513
			D-2	4,054
	c	Cumberland	A-0	203
			A-1	19
			B-2	23
	s	Cumberland	A-0	144
	t	Pelton	D-0	2,638
				34,608
Moderately coarse	s	Annapolis	B-2	385
	s	Bridgetown	B-2	1,041
			C-2	220
	r	Glenmont	B-1	2,960
			B-2	13,090
			C-2	516
	s	Avonport	A-0	707
			B-0	342
	s	Somerset	A-0	217
			B-0	8,893
			B-1	415
			B-2	222
			C-0	1,996
			C-1	246
			C-2	128
	t	Berwick	D-0	87
	t	Woodville	D-0	60
	w	Kentville	A-0	1,176
			A-2	69
	w	Debert	A-0	1,500
			A-1	205
			A-2	725
				35,210
Coarse	s	Canning	B-0	1,264
			C-0	2,351
	s	Torbrook	A-0	403
			A-1	205
			B-0	979
			B-1	727
			C-0	1,832
			C-1	1,697
			C-2	5,420
	s	Gulliver	B-1	327
			B-2	48
			C-2	363
	s	Kingsport	B-0	1,269
				16,885
Total area (Class 3)				101,527

Soil Capability Class 4

Soils in this class (Table 11) have severe limitations that restrict the choice of crops or require special conservation practices, or both. They are suited for only a few crops, or the yield for a range of crops may be low, or the risk of crop failure is high. The limitations may seriously affect such farm practices as timing and ease of tillage; planting and harvesting; and application and maintenance of conservation practices. These soils are low to medium in productivity for a narrow range of crops but may have higher productivity for a specially adapted crop.

Table 11.—Textures, Subclasses, Series and Acreages of Soils in Capability Class 4, Those with Severe Limitations

Texture	Subclass	Soil series	Topography and stoniness phase	Acres
Moderately fine	s	Hantsport	B-1	196
			B-2	806
			C-1	4,492
			C-2	10,192
			D-1	312
			D-2	1,042
	w	Lawrencetown	A-0	2,785
			B-0	176
	w	Mahone	B-2	101
				20,102
Medium	i	Bridgeville	A-0	2,616
	i	Cumberland	A-0	1,052
	r	Riverport	B-1	147
			B-2	478
				4,293
Moderately coarse	s	Halifax	B-2	48
	r	Rossway	B-2	35,607
			C-2	7,606
	w	Roxville	A-2	635
			B-2	166
			C-2	645
				44,707
Coarse	s	Canning	C-0	302
			D-0	31
	s	Cornwallis	A-0	5,293
			B-0	9,488
			C-0	3,557
	s	Nictaux	A-0	811
			B-0	4,031
			B-1	88
			B-2	258
			C-0	1,734
			C-1	71
			C-2	668
	s	Torbrook	D-0	103
			D-1	392
			D-2	275
	w	Kingsport	A-0	4,723
			A-1	106
				31,931
Total area (Class 4)				101,033

The limitations include one or more of the following: adverse climate, undesirable soil characteristics, low fertility, low available soil moisture, poor structure or permeability, salinity, erosion, adverse topography, overflow, wetness, stoniness, shallowness to bedrock.

These soils also occupy about 20 percent of the land area of the County but are used much less for crops than the Class 3 soils. The fine-textured soils in this class have slow drainage and are slow to warm up in the spring. On the other hand, the coarse-textured soils are droughty except the Kingsport, which remains wet for long periods. The Bridgeville and Cumberland soils on the floodplains of the rivers are often flooded and also have a frost hazard. The Lawrencetown, Mahone and Roxville series are difficult to drain as they usually receive runoff from surrounding land and the texture or the bedrock retards movement of water through the soil. The Rossway series are limited in use by frequent outcropping of the bedrock. Most of the Lawrencetown, Bridgeville and Cumberland series are cleared, but large areas of the other soils are still in forest. The acreage in forest ranges from 85 percent in the Rossway series to about 60 percent in some of the others. Most of the cleared areas are limited to hay and grain. The coarse-textured soils are not well suited to these crops, but may be used for cash crops if moisture is supplied by irrigation and large amounts of organic matter and fertilizers are applied. These factors make them generally uneconomical to use.

Soil Capability Class 5

Soils in this class (Table 12) are capable only of producing perennial forage crops, but improvement practices are feasible. The limitations are so severe that the soils are not capable of use for sustained production of annual field crops.

Table 12.—Textures, Subclasses, Series and Acreages of Soils in Capability Class 5, Those Limited to Perennial Forage Crops

Texture	Subclass	Soil series	Topography and stoniness phase	Acres
Moderately fine	w	Mahone	A-1	175
				175
Medium	w	Middlewood		260
	w	Chaswood		1,214
	i	Cumberland		49
				1,523
Moderately coarse	w	Masstown	A-0	288
			A-2	269
				557
Coarse	w	Millar	A-0	3,109
			A-1	99
	t	Nictaux	D-0	180
	t	Cornwallis	D-0	612
				4,000
Total area (Class 5)				6,255

They may be improved by use of farm machinery for growing native or tame species of perennial forage plants. The improvement practices may include clearing of bush, cultivation, seeding, fertilizing or water control.

In Kings County the soils are limited in use by droughtiness, wetness or steep slopes. On the Nictaux and Torbrook series, permanent pasture may be difficult to maintain because of droughtiness. But it is possible to grow deep-rooted plants such as alfalfa and, once they are established, it may be profitable to maintain good pastures on these soils even with irrigation. Class 5 soils occupy about one percent of the area.

Soil Capability Class 6

Soils in this class (Table 13) are capable only of producing perennial forage plants, but improvement practices are not feasible. They provide some sustained grazing for farm animals but have such severe limitations that improvement by use of farm machinery is impractical. Soils may be placed in this class because the terrain prevents use of farm machinery, or because the soils are not responsive to improvement practices, or because the grazing season is short. Where costly clearing is required to change Class 7 areas to Class 6 areas, those areas are rated as Class 7.

Cleared areas of Rossway soils and areas of salt marsh are the only soils in this group. The Rossway soils are too stony to permit the use of machinery, but are suitable for grazing. The salt-marsh areas are covered with water by each high tide and have limited value for grazing. The soils in this class occupy less than one percent of the surveyed area.

Table 13.—Textures, Subclasses, Series and Acreages of Soils in Capability Class 6, Those Limited to Unimproved Pasture

Texture	Subclass	Soil series	Topography and stoniness phase	Acres
Moderately fine	i	Salt Marsh	A-0	2,942
				2,942
Moderately coarse	p	Rossway	B-3	171
			C-3	1,194
				1,365
Total area (Class 6)				4,307

Soil Capability Class 7

Soils and lands in this class (Table 14) are not capable of use for agriculture. They have limitations so severe that they are not capable of use for arable agriculture or permanent pasture. All classified areas not included in Classes 1 to 6 are placed in this class. Bodies of water too small to show on maps are included in this class.

The land in this class occupies about 45 percent of the County. The main limitation is excessive stoniness or steep slopes. More than 95 percent of the land is under forest.

Table 14.—Textures, Subclasses, Series and Acreages of Soils in Capability Class 7, Those Lands Unsuited for Agriculture

Texture	Subclass	Soil series	Topography and stoniness phase	Acres
Moderately fine	p	Wolfville	B-3	454
			C-3	5,552
	p	Mahone	A-3	179
				6,185
Medium	p	Morristown	B-3	14,018
			C-3	6,846
			C-4	2,411
			D-3	154
			B-4	494
			E-1	109
	p	Rawdon	C-3	516
	p	Riverport	A-3	380
				24,928
Moderately coarse	p	Bridgetown	B-3	19,243
			B-4	8,545
			C-3	800
		Gibraltar	B-3	514
			B-4	93,497
			C-4	31,750
			E-4	451
	p	Halifax	B-3	195
			B-4	11,359
		Rossway	B-3	10,317
			C-3	14,631
			D-3	325
			D-4	1,849
	p	Annapolis	A-4	84
			B-3	64
	p	Aspotogan	A-4	4,310
			B-4	450
	p	Bayswater	B-4	541
	p	Danesville	B-4	251
	p	Masstown	A-3	467
	p	Tiddville	A-2	69
			A-3	140
		Rocky Land		6,800
				206,652
Coarse	p	Nictaux	B-3	1,423
			B-4	287
		Kingsport	C-3	201
			B-4	67
	p	Torbrook	B-3	46
			D-3	251
				2,275
Total area (Class 7)				240,040

Ratings of the Soils for Various Crops

The soils of Kings County that are suitable for crop land differ widely in the range of crops for which they are most suitable. Some soils are more suitable than others for certain crops. Much depends on the ability of the soil to provide the requirements of plants, such as nutrients, temperature, moisture and aeration, at various stages of growth. Some of this ability can be predicted from knowledge of the inherent fertility and physical properties of the soil, but the best measure is crop yields. Soil management also is important. Good management is required on all soils for high productivity.

Reliable figures for yields of crops are not available for all soils in the County. Much was learned by observation during the survey and from information obtained from farmers and agricultural workers. The ratings of the soils for specific crops in Table 15 are based largely on this information.

The soils in each class are rated on their suitability for the crops commonly grown in the area. Some soils appear in more than one class because in some areas they have physical limitations that make them less suitable for the same crops. The ratings are general, since areas of soils classed as good crop land may contain small parcels of poor crop land. Similarly, soils rated as poor crop land may have value for certain crops.

Table 15.—Ratings[1] of the Soils in Capability Classes 2-4 for Selected Crops[2]

Series	Acres	Hay	Grain	Apples	Small fruits	Potatoes	Canning crops	Pasture
Capability Class 2: Good crop land								
Wolfville	9,007	G	G	G	F	G-F	G-F	G
Hantsport	831	G	F-G	P	F	F-P	F-P	G
Pelton	8,694	G	G	E	F-G	G	G	G
Stewiacke	360	E	G	P	P	G	G	E
Cumberland	—	G	G	P	P	G	F-G	G
Berwick	10,957	G	G	E	E	G	E	F
Woodville	14,498	G	G	E	E	E	E	F
Somerset	—	F	F	F-G	F-G	F-G	F-G	P
Kentville	6,318	G	G	F	F-P	F-P	G-F	F-G
Debert	993	G	F	P	P	F-P	F-P	F-G
Capability Class 3: Good to fair crop land								
Middleton	3,452	G	G	G	F-P	F-P	P	G
Fash	87	G	G	F-G	P	F-P	F-P	G
Acadia	8,470	E	G	P	P	F-P	P	E
Wolfville	1,165	F-G	G	G	P	F-P	F-P	G
Morristown	25,014	G	G	E	F-G	F	F-G	G
Pelton	2,638	F-G	F	G	P	P	P	F-G
Avonport	1,049	F	F	P	F-P	P	P	F
Somerset	—	F-P	F-P	F-P	F-P	F	P	P
Berwick	87	F-G	F-G	G	G	F	F	F
Woodville	60	G	G	G	G	F	F	F
Annapolis	385	G	G	F	F-P	F	P	F-G
Bridgetown	1,261	G	G	G	F	P	P	F
Roxville	811	F	F	P	P	P	P	F
Glenmont	16,566	G	G	F-G	F-G	G	G	F-G
Kentville	1,176	G	F-G	F	P	P	F-P	F-G
Debert	2,430	G	F	P	P	P	P	F-G
Canning	3,917	F-G	F	F	F-G	F	F	F-P
Torbrook	11,263	F-P	F-P	F	F-P	P	P	P
Gulliver	738	F-G	F-G	F-P	F	E	F-G	F
Kingsport	369	F	F-P	P	P	P	P	G
Capability Class 4: Fair to poor crop land								
Hantsport	—	F	F-P	P	P	P	P	F
Lawrencetown	2,961	F-G	F	P	P	P	P	G
Mahone	101	F	P	P	P	P	P	F
Bridgeville	2,616	F	P	P	P	P	P	F
Cumberland	—	F	F-P	P	P	P	P	F
Riverport	625	P	P	P	P	P	P	F-P
Halifax	48	F	F	P	P	P	P	F
Rossway	43,213	F	F	P	P	F	F	F
Roxville	1,446	P	P	P	P	P	P	F-P
Canning	31	P	P	F-P	P	F-P	P	P
Cornwallis	18,338	P	P	P	F-P	F-P	P	P
Nictaux	7,661	P	P	P	P	F-P	P	P
Torbrook	770	F-P	F-P	F-P	P	P	P	F-P
Kingsport	4,829	F	P	P	P	P	P	F

[1]E, excellent; G, good; F, fair; P, poor; F-G, fair to good; F-P, fair to poor.
[2]Classes 5 to 7 are unsuitable for crops.

PHYSICAL AND CHEMICAL COMPOSITIONS OF THE SOILS

The physical and chemical analyses of a soil help to predict its usefulness for the growth of plants. They indicate also the nature and extent of the changes in the parent material due to soil-forming processes.

In the County considerable amounts of nutrients, organic matter, iron, aluminum and clay have been removed from the upper part of the soil to the lower horizons, or from the soil completely (Table 16). The soils, therefore, are generally acid and low in organic matter and require lime and fertilizer and organic matter for profitable production of crops.

Not all the soils of the County were analyzed, but the records in Table 16 indicate the variation in composition that may be expected among the soils. Some of the differences are brought out in the following discussion.

Organic Matter and Nitrogen

The decomposition of organic matter and the production of nitrogen in the soil depend on factors that influence biological activity, such as temperature, moisture, aeration, acidity, the supply of nutrients and the amount and kind of organic matter present. Decomposition proceeds faster when the soil is well aerated and temperatures are in the range 75° to 95°F. Under forest, annual addition of leaf litter and decomposition of surface organic matter tend to balance one another so that organic matter levels remain practically constant. When land is cleared, a new environment is created. Increased aeration induces decomposition of the organic matter, and the hazard of mechanical or erosion losses is increased. The organic matter has to come to a new equilibrium with its environment, generally at a lower level than under forest.

The loss of volatile material when the soil is heated to a high temperature is some indication of the amount of organic matter present. A more accurate measure is obtained by measuring the amount of carbon dioxide in the volatile material. The loss of volatile material from the surface layers of forested soils ranges from 60 to 90 percent, but in cultivated soils the range is about 6 to 10 percent. Not all of this is organic matter.

In the County the Glenmont and Rossway series are the highest in organic matter. Some other series have much organic matter in the surface layer, but little in the rest of the profile. The coarse-textured soils are generally lower in organic matter than the others. The Glenmont and Rossway series have considerable organic matter in the B horizon as a result of podzolization, and the Canning, Berwick, Kingsport and Hantsport series have an appreciable amount.

The amount of nitrogen in the soil is closely related to the amount of organic matter, which furnishes the energy for the growth of nitrogen-producing organisms. Carbon is used for energy and a carbon-nitrogen ratio of 16 to 1 in the organic matter is considered to be optimum for the growth of organisms. The effect of organic matter on the soil depends on its state of decomposition. Undecomposed materials have a mechanical effect in aiding infiltration and preventing erosion. As decomposition proceeds, the products of decomposition act as binding agents on the soil particles, improving the structure. Finally, a residue known as humus remains. This material is important in the soil processes, acting as a source for nitrogen and phosphorus.

Table 16.—Chemical and Physical Analyses of Profiles of Representative Soils

Horizon	Depth Inches	pH	Loss on Ignition	Total content, %							Free Fe %	Milliequivalents per 100 grams of soil				Gravel %	Total sand 2-.05 mm. %	Fine sand .25-.05 mm. %	Silt .05-.002 mm. %	Clay Below .002 mm. %
				C	N	SiO_2	R_2O_3	Fe_2O_3	CaO	MgO		Exchange capacity	Exchangeable bases							
													Ca	Mg	K					
Wolfville loam																				
Ap	0–8	5.3	5.2	1.63	.11	76.5	15.1	1.5	.24	.72	1.04	12.7	1.37	.83	.14	10.2	49.1	28.6	36.9	14.0
Bfh1	8–16	5.3	2.7	.16	.03	77.1	14.2	1.8	.29	.94	.97	8.2	2.31	2.76	.15	6.1	53.4	31.0	31.7	14.9
Bfh2	16–24	5.4	2.9	.09	.03	73.7	21.2	2.7	.44	1.26	1.03	13.8	6.77	6.62	.28	9.1	47.0	28.8	33.2	19.8
C	24–36	5.8	2.8	.05	.03	73.8	18.3	2.7	.16	.55	.91	16.2	8.35	7.39	.30	5.4	47.7	26.9	33.2	19.1
Fash silty clay loam																				
Ap	0–8	4.8	9.0	3.02	.20	67.0	20.7	4.1	.27	1.10	1.43	17.5	4.03	1.11	.28	1.7	29.6	22.1	49.3	21.1
Bfhgj	8–14	4.7	5.2	.56	.07	63.0	26.6	5.6	.14	1.71	1.54	14.9	1.23	.50	.24	0.0	13.6	12.6	53.3	33.1
Bfgj	14–18	4.6	4.7	.31	.05	62.9	26.6	5.6	.10	1.66	1.60	13.2	.58	1.00	.26	0.0	16.9	14.9	52.0	31.1
C	18 +	4.6	4.2	.11	.04	64.1	26.0	5.5	.67	1.48	1.62	13.1	.70	1.22	.28	0.0	20.3	19.2	50.0	29.7
Hantsport loam																				
Ap	0–4	4.5	8.5	3.45	.19	68.7	18.6	4.4	.13	.59	2.02	15.0	.81	.55	.14	25.3	34.6	19.7	47.0	18.4
Bfhg	4–12	4.6	5.2	1.08	.09	71.8	20.3	4.7	.10	.73	2.18	8.4	.23	.28	.06	33.7	39.7	21.3	42.0	18.3
Bfg	12–21	4.7	4.8	.50	.05	69.6	22.4	5.0	.12	.92	1.96	7.0	.26	.28	.06	37.9	44.7	23.5	34.2	21.1
C	21 +	4.7	4.1	.22	.05	67.5	23.9	5.5	.16	1.21	1.96	8.5	1.26	1.64	.12	23.2	36.8	19.9	40.0	23.2
Morristown loam																				
Ap	0–4	4.6	11.2	4.41	.29	68.8	17.1	4.0	.28	.74	1.51	17.3	1.60	.33	.18	26.9	45.5	29.9	38.4	16.1
Bfh1	4–10	4.9	5.6	1.21	.09	72.1	19.6	4.6	.16	.86	1.80	7.6	.23	.22	.08	22.7	47.7	24.8	42.1	10.2
Bfh2	10–22	4.9	3.7	.66	.05	78.7	14.5	3.3	.16	.62	1.17	4.9	.09	.11	.02	24.2	67.3	31.7	25.5	7.2
BC	22–36	5.0	2.9	.25	.03	78.6	15.9	3.7	.25	.80	1.06	4.1	.12	.19	.04	21.1	63.7	32.9	28.6	7.7
C	36 +	5.3	3.4	.06	.03	71.6	20.2	4.8	.26	1.21	1.32	8.7	3.91	3.36	.12	73.1	49.7	26.6	34.3	16.0
Lawrencetown clay																				
Ap	0–10	4.9	16.8	5.63	.52	48.9	29.0	5.4	.61	1.94	1.34	32.1	14.36	2.47	.42	0.0	2.3	1.8	38.0	59.8
Bg1	10–20	5.3	6.8	.87	.10	58.1	29.5	6.7	.66	1.61	2.60	23.0	14.36	2.72	.30	0.0	2.4	2.1	50.9	46.7
Bg2	20–28	5.3	4.3	.85	.08	72.1	19.3	3.4	.43	1.33	.70	11.0	7.88	1.53	.14	0.0	25.9	24.7	48.9	25.2
Cgj1	28–36	5.5	2.5	.32	.03	75.0	16.7	3.5	.56	1.29	.90	6.9	4.90	1.03	.12	0.0	52.8	35.0	33.8	13.4
Cgj2	36 +	6.0	2.8	.14	.03	71.8	19.3	4.2	.63	1.63	1.03	7.2	5.72	1.11	.16	0.0	44.0	37.1	40.4	15.6
Pelton loam																				
Ap	0–2	4.2	8.7	4.11	.18	74.7	13.0	1.9	.18	.62	.88	15.4	.39	.75	.19	0.0	46.9	36.0	41.2	11.9
Ae	2–6	4.7	2.4	4.03	.03	84.7	10.2	2.0	.43	.29	.56	6.4	.20	.52	.04	0.0	49.8	41.5	42.6	7.6
Bfh1	6–18	4.9	2.9	.48	.03	75.1	17.1	1.3	.17	1.14	.90	7.8	.12	.41	.10	0.0	43.9	36.2	41.4	14.7
Bfh2	18–24	5.0	3.0	.32	.03	75.8	16.8	1.9	.18	1.27	.90	7.7	.15	.49	.10	0.0	47.2	39.7	39.2	13.6
C	24 +	5.0	2.1	.10	.02	75.1	17.2	1.8	.15	1.33	.34	7.5	.12	.47	.13	0.0	47.0	39.7	39.8	13.2

Table 16.—Continued

Horizon	Depth Inches	pH	Loss on Ignition	Total content, %							Free Fe %	Milliequivalents per 100 grams of soil				Gravel %	Total sand 2-.05 mm. %	Fine sand .25-.05 mm. %	Silt .05-.002 mm. %	Clay Below .002 mm. %
				C	N	SiO_2	R_2O_3	Fe_2O_3	CaO	MgO		Exchange capacity	Exchangeable bases							
													Ca	Mg	K					
Woodville sandy loam																				
Ap	0–6	4.9	3.7	1.34	.09	84.3	9.6	.9	.14	.42	.55	11.5	1.70	.73	.08	2.9	72.9	48.2	16.8	10.3
Bfh1	6–16	5.2	3.7	.84	.04	80.3	12.7	3.5	.19	.64	.70	14.8	.50	.29	.05	0.0	72.8	44.2	19.3	7.9
Bfh2	16–24	5.2	3.2	.73	.04	81.4	12.2	3.5	.09	.63	.64	12.8	.65	.37	.05	3.2	72.4	43.4	19.7	7.9
Bf	24–30	5.2	2.8	.54	.04	81.8	11.7	2.9	.09	.67	.62	11.9	.59	.58	.06	1.3	72.2	44.9	20.4	7.4
C	30 +	5.1	1.8	.14	.03	82.3	12.4	1.2	.08	.80	.49	11.2	.80	.57	.11	3.2	71.3	44.5	21.5	7.2
Berwick loamy sand																				
L-H	2–0	3.8	83.2	44.85	1.31	12.8	1.5	.5	.75	.25	—	93.1	16.33	5.67	1.65	—	—	—	—	—
Ae	0–2	4.6	2.1	.58	.06	89.6	8.0	1.4	.11	.17	.52	3.3	.15	.10	.02	16.6	79.3	36.2	17.5	3.2
Bfh	2–8	5.2	4.9	1.02	.08	80.0	15.6	3.0	.18	.53	1.43	7.1	.17	.09	.11	15.3	77.8	41.3	19.0	3.2
Bf	8–16	5.0	3.8	.59	.06	77.7	15.4	2.6	.23	.71	1.01	7.3	.32	.17	.09	22.0	73.4	33.0	23.7	2.9
C	16 +	5.3	3.0	.25	.05	77.6	15.7	2.8	.41	.75	.89	6.1	.51	.80	.09	24.9	68.8	37.5	28.0	3.2
Somerset loamy sand																				
Ap	0–3	4.7	3.9	2.12	.10	86.9	6.7	.8	.16	.19	.32	5.7	.85	.33	.11	5.4	82.0	29.0	18.0	0.0
Ae	3–12	4.8	.3	.08	.02	93.5	4.2	.4	.09	.01	.13	.7	.20	.10	.01	11.9	87.5	26.2	11.6	.9
Bfhc1	12–20	4.9	3.0	.34	.03	79.4	13.7	2.1	.13	.52	.32	9.7	.25	.12	.09	11.5	72.0	27.8	17.5	10.5
Bfhc2	20–30	5.0	2.4	.18	.03	82.2	12.4	1.2	.11	.56	.50	7.0	.13	.11	.06	10.5	77.3	33.4	18.7	4.0
C	30 +	4.9	1.0	.05	.02	87.4	8.2	.5	.11	.20	.11	2.8	.09	.02	.02	16.7	94.0	6.7	5.0	1.0
Glenmont loam																				
Ap	0–5	5.6	19.7	8.06	.50	52.7	22.2	6.8	1.81	2.37	1.68	32.2	8.88	2.83	—	7.8	35.4	24.5	46.9	17.7
Bfh1	5–10	5.5	12.5	3.39	.23	56.2	25.4	7.2	1.42	2.41	1.80	21.3	1.63	.52	.38	19.3	41.2	26.8	48.7	10.1
Bfh2	10–18	5.5	10.4	2.54	.18	58.5	25.6	7.4	1.45	2.46	1.80	18.8	1.05	.36	.20	20.4	39.2	26.7	51.3	9.5
Bfh3	18–28	5.9	8.2	1.72	.14	61.2	24.6	7.4	1.67	2.47	1.60	16.4	2.86	1.22	.50	20.1	40.0	27.1	51.2	8.8
C	28 +	5.9	4.3	.15	.02	64.0	24.5	7.6	1.73	2.81	1.43	17.9	7.85	5.89	.54	8.3	38.9	27.6	48.2	12.9
Rossway silt loam																				
L-H	3–0	5.1	38.1	19.90	.98	37.6	18.2	6.2	2.57	1.74	2.00	63.3	13.80	4.20	1.20	—	—	—	—	—
Ae	0–2	5.3	7.8	2.72	.14	63.6	22.1	8.1	2.02	1.73	1.96	20.6	5.70	2.34	.46	4.3	32.5	20.9	55.0	12.5
Bh	2–12	5.5	16.7	5.88	.31	53.3	24.4	5.1	1.80	1.78	1.57	33.2	4.97	1.67	.34	19.4	40.0	23.4	50.5	9.5
Bfh	12–24	5.7	7.3	1.79	.13	67.8	19.7	4.1	1.89	1.96	.91	21.9	3.25	.91	.26	31.5	55.1	27.7	41.5	3.4
C	24 +	5.9	4.1	.50	.03	68.4	19.7	4.4	2.98	2.61	.62	10.3	2.84	.52	.14	38.3	49.9	23.4	48.4	1.7
Debert sandy loam																				
L-H	3–0	3.8	70.6	37.25	1.31	23.2	4.6	.8	.21	.26	—	83.2	1.80	3.17	1.38	—	—	—	—	—
Ae	0–4	4.2	2.4	.70	.07	84.1	9.8	.6	.32	.23	.07	6.0	.08	.18	.04	7.7	71.7	26.2	21.4	6.9
Bfhg	4–12	4.7	2.2	.63	.06	83.9	10.7	2.7	.17	.41	.18	9.4	.10	.08	.06	10.4	56.9	27.1	31.1	12.0
Bfg	12–24	4.9	2.5	.12	.05	80.0	14.6	2.3	.09	.26	.84	6.4	.13	.89	.06	11.4	62.5	26.1	32.3	5.2
C	24 +	4.8	2.2	.05	.04	81.1	13.8	2.1	.09	.68	.71	7.6	.89	1.08	.12	13.1	65.2	24.5	24.7	10.1

Kentville loam

Ap	0–3	4.7	7.6	3.05	.18	74.3	12.4	1.7	.24	.57	.79	15.4	3.10	1.06	.12	1.1	36.0	26.9	48.3	15.7
Ae	3–5	4.7	2.5	.67	.05	84.2	10.4	.9	.29	.34	.21	7.5	.89	.19	.04	4.1	49.2	36.7	42.8	8.0
Bfhgj	5–14	4.9	2.6	.36	.03	79.1	13.9	2.1	.31	.34	1.06	7.7	1.08	.67	.07	8.9	46.0	29.7	43.3	10.7
Bfgj	14–30	4.8	3.2	.17	.02	73.6	18.4	3.1	.37	1.12	.61	14.5	7.21	2.35	.23	7.2	46.9	27.0	30.4	22.7
C	30 +	5.3	2.6	.05	.01	75.2	16.2	2.7	.47	1.04	.74	12.6	9.53	2.60	.20	10.8	53.1	30.0	29.3	17.6

Cornwallis sand

L-H	2–0	4.3	54.7	30.00	1.21	37.8	6.0	1.0	.70	.46	.60	53.2	12.45	1.42	1.11	—	—	—	—	—
Ae	0–7	4.2	.8	.27	.05	94.4	4.1	.6	.07	.06	.18	1.2	.10	.07	.02	0.0	90.8	29.7	8.4	.8
Bfh	7–15	5.0	3.1	.61	.06	84.4	11.0	1.6	.11	.25	.60	4.9	.08	.10	.04	2.1	93.8	33.1	4.3	1.9
Bfhcj	15–24	5.1	1.1	.63	.05	86.0	12.2	1.9	.15	.33	.50	5.6	.23	.11	.03	3.1	96.4	71.8	2.3	1.3
C1	24–30	5.0	1.1	.07	.04	88.2	8.8	1.5	.21	.32	.22	1.8	.09	.10	.02	0.0	98.1	65.3	1.3	0.6
C2	30 +	5.0	1.0	.09	.04	88.3	8.8	1.2	.16	.32	.28	2.0	.07	.09	.02	0.0	99.1	57.7	.5	.4

Canning loamy sand

Ap	0–3	4.4	5.3	2.60	.17	86.0	7.2	2.8	.59	1.06	.54	10.8	.53	.03	.17	0.0	80.8	76.0	14.3	4.9
Ae	3–6	4.8	1.0	.35	.04	89.9	5.1	2.8	.08	.92	.25	2.4	.30	.23	.03	0.0	84.6	80.0	13.2	2.2
Bfh1	6–16	5.0	4.4	1.02	.07	79.8	13.3	2.3	.49	.76	1.06	9.5	.14	.33	.06	0.0	78.9	75.7	15.0	6.1
Bfh2	16–26	5.3	3.9	.86	.05	80.7	12.7	1.7	.14	.58	.81	9.9	.19	.18	.05	0.0	84.6	80.2	11.2	4.2
Bf	26–30	5.4	2.1	.24	.02	84.4	11.2	1.7	.13	.58	.50	4.5	.13	.25	.06	0.0	86.2	80.9	11.8	2.0
C	30 +	5.5	2.1	.15	.03	82.6	12.4	.8	.16	.60	.57	5.4	.38	.33	.11	0.0	85.8	79.2	12.4	1.8

Nictaux sand

Ap	0–6	5.8	5.6	2.55	.18	85.1	9.1	1.1	.24	.24	.53	8.6	4.09	2.06	.12	8.5	81.3	35.3	15.3	3.4
L-H	2–0	4.3	79.3	45.00	.88	17.4	1.9	.3	.62	.28	.34	—	11.24	3.28	1.17	1.2	—	—	—	—
Ae	0–9	4.2	.6	.24	.03	90.2	6.3	.4	.13	.05	.16	1.2	.09	.04	.02	32.0	88.6	22.0	10.5	.9
Bfhc	9–18	5.0	2.6	.40	.04	82.3	12.7	1.8	.11	.23	.11	4.5	.09	.10	.03	38.5	94.3	18.3	3.8	1.9
Bfhcj	18–36	5.3	1.5	.20	.06	86.1	9.8	1.0	.18	.20	.34	1.9	.09	.06	.02	12.7	97.5	26.9	2.0	.5
C	36 +	5.3	1.2	.17	.05	87.5	7.7	1.0	.17	.29	.25	1.7	.09	.16	.04	13.7	92.6	46.0	6.8	.6

Torbrook gravelly sandy loam

L-H	2–0	4.6	28.8	15.69	.64	54.8	9.7	1.7	.61	.44	—	36.1	7.94	2.23	.63	1.4	—	—	—	—
Ae	0–3	4.3	1.1	.21	.05	90.3	7.5	.8	.11	.11	.29	2.9	.07	.24	.02	28.0	53.2	19.4	45.0	1.8
Bfh1	3–10	4.2	2.6	.69	.06	83.9	11.3	2.2	.18	.42	1.02	5.2	.08	.09	.02	29.0	80.3	10.3	16.5	3.2
Bfh2	10–18	4.6	3.3	.88	.08	81.1	12.3	2.3	.25	.48	.82	7.2	.08	.10	.02	36.2	89.6	7.7	8.8	1.6
C	18 +	5.2	1.0	.07	.03	86.5	9.9	1.5	.30	.45	.17	1.4	.15	.05	.02	56.1	99.0	1.3	.6	.4

Kingsport loamy sand

L-H	3–0	3.3	80.0	42.50	.96	15.2	3.9	.7	.29	.29	—	95.4	4.56	3.33	.34	—	—	—	—	—
Aegj	0–4	3.7	2.0	.54	.04	90.2	6.2	.4	.10	.10	.11	4.2	.06	.16	.04	0.0	77.4	58.9	18.9	3.7
ABgj	4–7	4.2	4.1	1.62	.06	85.4	8.5	.8	.09	.18	.17	10.7	.06	.11	.04	1.2	86.0	57.3	9.3	4.7
Bfhcgj	7–17	4.8	2.9	.71	.03	84.0	11.3	2.9	.12	.19	1.06	5.5	.09	.06	.02	3.1	90.2	42.2	8.6	1.2
Bfgj	17–36	4.7	2.2	.26	.02	82.4	12.1	2.7	.10	.74	.89	5.2	.06	.11	.02	.8	89.6	87.4	8.8	1.6
C	36 +	4.6	1.4	.06	.01	83.6	11.3	2.3	.18	.57	.67	4.3	.06	.16	.04	0.0	81.9	57.5	15.5	2.6

The maintenance of high levels of soil organic matter is not economically feasible. Large quantites would be required to supply all the nitrogen for a crop and fertilizers can supply a large part more economically. However, organic matter should be maintained at a level that ensures good physical conditions in the soil. This can be done best by use of a short rotation of grass–legume crops with cash crops.

pH

pH is a term used to indicate the acidity or alkalinity of a soil. Values below 7 indicate acidity, and those above 7 alkalinity. Soils become acid through leaching. In percolating water, the products formed when organic matter decomposes remove cations from the soil colloids. Sandy soils, being lower in colloidal material, become acid more rapidly than do fine-textured soils. The pH affects the solubility and availability of many plant nutrients, the growth of bacteria and production of nitrogen.

In the County the soils are all acid and require liming for profitable crops. The Lawrencetown, Wolfville, Glenmont and Rossway series are less acid than the others. The average pH of surface layers is 4.5, and of the parent material 5.3.

Calcium and Magnesium

The total content of calcium and magnesium depends on the kind of rocks from which the parent materials of the soil are derived. The Glenmont and Rossway series are high in these elements, reflecting the influence of the basic rocks on the parent material. Generally, the fine-textured soils are better supplied with calcium and magnesium because leaching is slower.

Exchangeable Bases

The capacity of a soil to hold exchangeable cations, or the cation-exchange capacity, gives some indication of the nutrients available for plant growth. The organic matter and the clay fraction have the ability to hold elements such as calcium, sodium, magnesium, potassium and others on their surfaces in the form of ions. Generally, any element or cation can be replaced by another. By washing the soil with a solution containing the appropriate element, one can displace all the cations in turn and get a measure of the elements held there. The exchange capacity usually ranges between 2 and 50 milliequivalents per 100 grams of soil.

The amounts of exchangeable bases (Table 17) were calculated on the basis of pounds of nutrient per acre to plow depth.

The Lawrencetown, Glenmont, Rossway, Kentville and Wolfville series are the highest in available calcium and magnesium. In general, the available phosphorus is low in all the soils, but the Woodville and Lawrencetown series are better supplied than the others. Certain horizons of the other soils have a good supply of this element. The Lawrencetown, Glenmont, Rossway, Wolfville, Fash and Kentville series have more available potassium than the other soils. The availability of phosphorus and potassium depends to a large extent on the amount of organic matter and the acidity of the soil.

Table 17.—Available Nutrients in Pounds per Acre[1] in Horizons of Representative Soils

Series	Horizon	Depth Inches	Ca	Mg	K	P
Wolfville	Ap	0–8	549	202	109	36
	Bfh1	8–16	925	671	117	8
	Bfh2	16–24	2713	1608	218	16
	C	24–36	3346	1796	234	152
Fash	Ap	0–8	1615	270	225	132
	Bfhgj	8–14	493	121	188	12
	Bfgj	14–18	232	243	198	4
	C	18 +	280	296	215	18
Hantsport	Ap	0–4	324	134	104	3
	Bfh	4–12	92	68	45	0
	Bfg	12–21	104	68	52	0
	C	21 +	505	398	93	0
Morristown	Ap	0–4	641	80	146	5
	Bfh1	4–10	92	53	59	2
	Bfh2	10–22	36	27	20	2
	BC	22–36	48	46	25	6
	C	36 +	1567	816	90	11
Lawrencetown	Ap	0–10	5754	600	322	16
	Bg1	10–20	5754	661	228	4
	Bg2	20–28	3158	372	115	30
	Cgj1	28–36	1963	250	87	46
	Cgj2	36 +	2292	270	130	372
Pelton	Ap	0–3	156	182	148	24
	Ae	3–5	80	126	31	12
	Bfh1	5–14	48	100	78	24
	Bfh2	14–30	60	119	78	124
	C	30 +	48	114	101	82
Woodville	Ap	0–6	681	177	62	16
	Bfh1	6–16	200	70	39	232
	Bfh2	16–24	260	90	39	168
	Bf	24–30	236	141	47	72
	C	30 +	320	138	86	32
Berwick	L-H	2–0	632	—	134	18
	Ae	0–2	60	24	16	8
	Bfh1	2–8	68	22	86	10
	Bfh2	8–16	128	41	70	8
	C	16	204	194	70	6
Somerset	Ap	0–3	341	80	86	2½
	Ae	3–12	80	24	8	6
	Bfhc1	12–20	100	29	70	100
	Bfhc2	20–30	52	27	47	10
	C	30 +	36	5	16	2
Glenmont	Ap	0–5	3558	690	—	2
	Bfh1	5–10	633	126	302	4
	Bfh2	10–18	421	87	152	1
	Bfh3	18–28	1146	296	392	3
	C	28 +	3145	1431	428	15

[1]Calculated on the basis of 2,000,000 pounds of soil per acre to a depth of six inches for each horizon, except that organic horizons were calculated on the basis of 193,000 pounds per acre.

Table 17.—Concluded

Series	Horizon	Depth Inches	Ca	Mg	K	P
Rossway	L-H	3–0	534	98	90	16
	Ae	0–2	2284	568	359	12
	Bh	2–12	1991	406	265	12
	Bfh	12–24	1302	221	203	4
	C	24 +	1138	126	109	24
Debert	L-H	3–0	70	74	103	9
	Ae	0–4	32	44	31	4
	Bfhg	4–12	40	19	47	6
	Bfg	12–24	52	216	47	4
	C	24 +	357	262	93	12
Kentville	Ap	0–3	1242	257	94	20
	Ae	3–5	357	46	31	16
	Bfhgj	5–14	433	163	55	14
	Bfgj	14–30	2889	571	179	14
	C	30 +	3819	632	156	40
Cornwallis	L-H	2–0	482	33	83	13
	Ae	0–7	40	17	16	10
	Bfh	7–15	32	24	31	8
	Bfhcj	15–24	92	27	23	8
	C1	24–30	36	24	16	8
	C2	30 +	28	22	16	12
Canning	Ap	0–3	212	7	132	78
	Ae	3–6	120	56	23	8
	Bfh1	6–16	56	80	47	52
	Bfh2	16–26	76	44	39	84
	Bf	26–30	52	61	47	26
	C	30 +	152	86	86	32
Nictaux	Ap	0–6	1639	500	94	13
	L-H	2–0	435	77	98	4
	Ae	0–9	36	10	16	24
	Bfhc	9–18	36	24	23	12
	Bfhcj	18–36	36	14	16	14
	C	36 +	36	39	31	34
Torbrook	L-H	2–0	307	52	47	8
	Ae	0–3	28	58	16	4
	Bfh1	3–10	32	22	16	2
	Bfh2	10–18	32	24	16	6
	C	18 +	60	12	16	16
Kingsport	L-H	3–0	176	78	25	15
	Aegj	0–4	24	39	27	4
	ABgj	4–7	24	27	26	2
	Bfhcgj	7–17	36	14	15	0
	Bfgj	17–36	24	27	21	5
	C	36 +	24	39	27	5

Physical Composition

The soils of the County vary widely in physical composition. The finer-textured soils contain considerable silt as well as clay. A high silt content may impede drainage somewhat. Soils with more than 27 percent clay have moderately slow to slow drainage and need to be worked when the moisture conditions are suitable. The texture of a soil, such as clay loam or sandy loam, is determined by the percentages of sand, silt and clay in it (Figure 19).

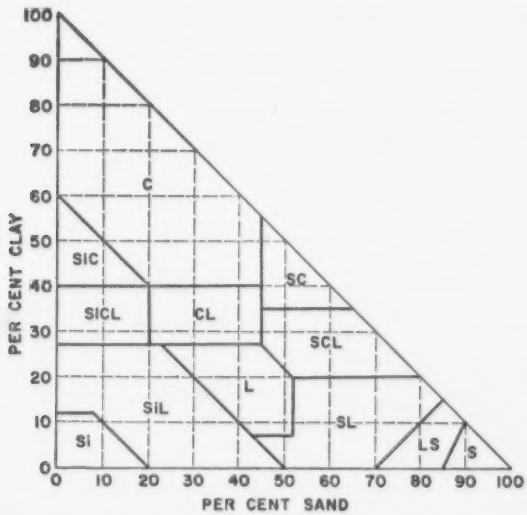

Figure 19—Percentages of clay and sand in the main textural classes of soils; the remainder of each class is silt. See Toogood, J. A., Can. J. Soil Sci. 38: 54-55, 1958. The limits between classes are as in *Soil Survey Manual*, U.S.D.A. Handbook 18, 1951.

Methods of Analysis

pH was determined electrometrically.

Loss on ignition, total silica, sesquioxides, calcium, magnesium and exchangeable bases were determined by methods given in *A. O. A. C. Methods of Analysis*, 6th ed., 1945. Exchangeable potassium was determined by the flame photometer.

Available phosphorus was determined by the method of E. Truog, (J. Amer. Soc. Agronomy 22: 874, 1930).

Free iron was determined by the method of V. J. Kilmer, (Soil Sci. Soc. Amer. Proc. 24: 420-425, 1960).

Physical analysis was done by the method of V. J. Kilmer and L. T. Alexander (Soil. Sci. 68: 15-24, 1949) with modifications by J. A. Toogood and T. W. Peters (Can. J. Agr. Sci. 33: 159-171, 1953).

Total carbon was determined by dry combustion (A. O. A. C. Methods of Analysis, 1945) with modifications for use with the Lindberg carbon apparatus.

Table 18.—Total and Cleared Acreages of the Soil Series and Phases

Phase	Acres	Percentage of land area	Acres cleared
Avonport series			
A–0	707	.13	634
B–0	342	.07	287
Total	1,049	.20	921
Berwick series			
A–0	201	.04	201
B–0	5,193	.99	3,299
B–1	2,585	.49	797
B–2	986	.19	280
C–0	1,235	.23	964
C–1	334	.06	104
C–2	423	.08	4
D–0	87	.02	36
Total	11,044	2.10	5,685
Bridgetown series			
B–2	1,041	.20	889
B–3	19,243	3.65	837
B–4	8,545	1.62	8
C–2	220	.04	151
C–3	800	.15	100
Total	29,849	5.66	1,985
Canning series			
B–0	1,264	.24	1,145
C–0	2,653	.50	2,458
D–0	31	.01	18
Total	3,948	.75	3,621
Cornwallis series			
A–0	5,293	1.00	2,701
B–0	9,488	1.80	4,099
C–0	3,557	.68	1,119
D–0	612	.12	445
Total	18,950	3.60	8,364
Cumberland series			
A–0	1,808	.35	1,159
A–1	103	.02	103
B–2	63	.01	23
Total	1,974	.38	1,285
Gibraltar series			
B–3	514	.10	16
B–4	93,497	17.74	64
C–4	31,750	6.02	—
E–4	451	.09	—
Total	126,212	23.95	80
Glenmont series			
B–1	2,960	.56	785
B–2	13,090	2.48	1,901
C–2	516	.10	—
Total	16,566	3.14	2,686

Table 18—Continued

Phase	Acres	Percentage of land area	Acres cleared
Gulliver series			
B–1	327	.06	327
B–2	48	.01	12
C–2	363	.07	203
Total	738	.14	542
Halifax series			
B–2	48	.01	48
B–3	195	.04	—
B–4	11,359	2.15	68
Total	11,602	2.20	116
Middleton series			
B–0	718	.14	446
C–0	1,076	.20	1,004
C–1	571	.11	441
D–2	1,087	.21	339
Total	3,452	.66	2,230
Morristown series			
B–0	471	.09	341
B–1	375	.07	163
B–2	10,474	1.99	5,321
B–3	14,018	2.66	697
B–4	494	.09	12
C–1	3,120	.59	1,602
C–2	10,574	2.00	5,348
C–3	6,846	1.30	661
C–4	2,411	.46	36
D–1	2,513	.48	717
D–2	4,054	.77	1,179
D–3	154	.03	80
E–1	109	.02	43
Total	55,613	10.55	16,200
Nictaux series			
A–0	811	.15	355
B–0	4,031	.77	2,163
B–1	88	.02	36
B–2	258	.05	112
B–3	1,423	.27	16
B–4	287	.05	—
C–0	1,734	.33	528
C–1	71	.01	48
C–2	668	.13	123
C–3	201	.04	—
D–0	180	.03	114
Total	9,752	1.85	3,435
Pelton series			
A–0	223	.04	195
B–0	2,940	.56	2,280
C–0	5,531	1.05	4,098
D–0	2,638	.50	1,927
Total	11,332	2.15	8,500
Rawdon series			
C–3	516	.10	8
Total	516	.10	8

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Table 18—Continued

Phase	Acres	Percentage of land area	Acres cleared
Rossway series			
B–2	35,607	66.6	6,269
B–3	10,488	1.99	171
C–2	7,606	1.44	1,406
C–3	15,285	3.00	1,194
D–3	325	.06	—
D–4	1,849	.35	—
Total	71,700	13.61	9,040
Somerset series			
A–0	547	.10	497
B–0	8,985	1.70	4,918
B–1	415	.08	415
B–2	222	.05	24
C–0	1,996	.38	1,203
C–1	246	.05	139
C–2	138	.02	8
Total	12,549	2.38	7,204
Stewiacke series			
A–0	360	.07	360
Total	360	.07	360
Torbrook series			
A–0	403	.08	215
A–1	205	.04	172
B–0	979	.18	629
B–1	727	.14	119
B–3	46	.01	8
C–0	1,832	.35	1,256
C–1	1,697	.32	1,342
C–2	5,420	1.03	1,712
D–0	103	.02	71
D–1	392	.07	233
D–2	275	.05	23
D–3	251	.05	16
Total	12,330	2.34	5,796
Wolfville series			
B–1	966	.18	550
B–2	900	.17	223
B–3	454	.09	163
C–0	4,077	.77	3,587
C–1	1,256	.24	831
C–2	1,808	.34	1,040
C–3	5,552	1.05	223
D–0	613	.12	591
D–1	552	.10	405
Total	16,178	3.00	7,613
Woodville series			
A–0	618	.12	575
B–0	7,845	1.49	6,579
C–0	6,035	1.14	6,035
D–0	60	.01	60
Total	14,558	2.76	13,249
Annapolis series			
A–4	84	.02	28
B–2	385	.07	315
B–3	64	.01	48
Total	533	.10	391

Table 18—Continued

Phase	Acres	Percentage of land area	Acres cleared
Bayswater series			
B–4	541	.10	
Total	541	.10	
Bridgeville series			
A–0	2,616	.50	2,476
Total	2,616	.50	2,476
Danesville series			
B–4	251	.05	
Total	251	.05	
Debert series			
A–0	1,500	.28	749
A–1	205	.04	80
A–2	725	.14	36
B–0	667	.13	299
B–1	226	.04	44
Total	3,323	.63	1,208
Fash series			
A–0	87	.02	72
Total	87	.02	72
Hantsport series			
B–0	272	.05	272
B–1	196	.04	115
B–2	806	.15	44
C–0	200	.05	200
C–1	4,851	.95	3,035
C–2	10,192	1.93	1,622
D–1	312	.06	100
D–2	1,042	.20	111
Total	17,871	3.43	5,499
Kentville series			
A–0	1,176	.22	884
A–2	69	.01	50
B–0	4,247	.82	2,917
B–2	180	.03	48
C–0	1,891	.36	1,670
Total	7,563	1.44	5,569
Kingsport series			
A–0	4,723	.90	2,296
A–1	106	.02	48
B–0	1,269	.24	443
B–4	67	.01	20
Total	6,165	1.17	2,807
Riverport series			
A–3	380	.07	—
B–1	147	.03	119
B–2	478	.09	—
Total	1,005	.19	119
Roxville series			
A–2	635	.12	104
B–2	166	.03	44
C–2	645	.12	—
Total	1,446	.27	148

Table 18—Concluded

Phase	Acres	Percentage of land area	Acres cleared
Acadia series			
A–0	8,470	1.61	8,470
Total	8,470	1.61	8,470
Aspotogan series			
A–4	4,310	.82	32
B–4	450	.08	—
Total	4,760	.90	32
Chaswood series			
A–0	1,214	.23	734
Total	1,214	.23	734
Lawrencetown series			
A–0	2,785	.53	2,785
B–0	176	.03	120
Total	2,961	.56	2,905
Mahone series			
A–1	175	.04	122
A–3	179	.03	—
B–2	101	.02	44
Total	455	.09	166
Masstown series			
A–0	288	.05	155
A–2	269	.05	—
A–3	467	.09	32
Total	1,024	.19	187
Middlewood series			
A–2	260	.05	52
Total	260	.05	52
Millar series			
A–0	3,109	.59	1,465
A–1	99	.02	52
Total	3,208	.61	1,517
Tiddville series			
A–2	69	.01	28
A–3	140	.03	12
Total	209	.04	40
Miscellaneous soils			
Peat	11,000	2.09	—
Salt marsh	2,942	.55	—
Rocky land	6,800	1.29	—
Coastal beach	95	.02	95
Eroded land	11,903	2.26	1,116
Total	32,740	6.21	1,211
Total land area	526,974	100.00	132,523
Lakes and rivers	20,221		
Total area	547,195		

SUMMARY

Kings County has an area of about 855 square miles, or 547,195 acres. The County was first settled in the early part of the 17th century by the French and later by United Empire Loyalists from New England. The area is favorable for fruit and vegetable growing and other agricultural enterprises, and the economy is based largely on this industry.

The population of the County has increased sharply since 1931. About 72 percent of the population is classed as rural and 25 percent of this are on farms. The County is serviced by a railway and an adequate system of roads.

The climate is humid with a mean annual temperature of 44° F and an annual precipitation of about 40 inches. The frost-free season ranges from 114 to 140 days and the degree-days above 42° F total about 2,500 per year.

The County consists of a broad central valley flanked on the north and south by hills that rise sharply from the valley floor to a height of about 700 feet above sea level. Several large rivers drain the valley floor. They are fed by streams flowing from the hills on either side and provide adequate surface drainage for the area. About 58 percent of the County is covered with productive forest. The main trees are white spruce, black spruce, balsam fir, red maple, pine and birch.

The soils have developed from glacial till, and from glaciofluvial and marine deposits ranging in texture from sand to clay. The well-drained soils (82 percent of the land area) are Podzols. Soils with imperfect drainage (7.5 percent) are Gleyed Podzols, being mottled or gleyed in part of the profile. The poorly drained soils (4 percent) are prominently mottled and, depending on the degree of development, may be Gleyed Podzols or Gleysols. The moderately fine textured soils occupy about 9 percent of the land area of the County, medium-textured soils about 14 percent, moderately coarse textured soils about 60 percent, and coarse-textured soils about 10 percent. The rest includes rocky land, peat, salt marsh, coastal beach and eroded land.

About 40 percent of the land area is occupied by 1,300 farms and nearly 38 percent of the farm land is improved. Nearly 86 percent of the farms are 10 to 150 acres in area. About 72 percent of the improved land is in crops, half of which is hay.

Nearly 48 percent of the land area is suitable for agriculture other than pasture. About 10 percent is good crop land with few limitations and suitable for a wide range of crops. About 19 percent is moderately good land that requires more careful management and is restricted to a narrower range of crops. The remaining 20 percent has severe limitations on the choice of crops and the number of years a crop may be grown successfully. The rest of the land is best suited to pasture, forestry, wildlife or recreation.

All the soils of the area require lime and fertilizer for profitable crops. Maintenance of organic matter is a problem in the coarser-textured soils.

GLOSSARY

Alluvium—Sediment deposited by streams.

Available nutrients—Nutrients capable of being taken up by plants at a rate important in crop production.

Consistence—The degree and kind of cohesion or adhesion of the soil mass, or its resistance to deformation or rupture.

Drift—Material deposited by glacial ice or by meltwater from a glacier.

Glaciofluvial material—Material sorted and deposited by water that originated mainly from the melting of glacial ice.

Gleyed soil—A dull-colored soil with yellow and gray mottling, due to partial oxidation and reduction of iron through intermittent saturation with water in the presence of organic matter.

Gleysolic order—Soils of this order are saturated with water at some season, or are artificially drained. They have developed under hydrophytic vegetation or may be expected to produce hydrophytic vegetation if left undisturbed. They may have an organic horizon less than 12 inches thick, or an Ah horizon, or both. The B and C horizons are dull colored and mottled.

Gleysol great group—In this great group are Gleysolic soils that have an Ah horizon not more than 3 inches thick under virgin conditions. When mixed to a depth of 6 inches, this layer (Ap) has less than 3 percent organic matter or it differs from the next underlying horizon (Ae, B or C) by not more than 1.5 Munsell units of value when moist if the underlying horizon has a value of 4 or more, or by not more than 1 unit if the underyling horizon has a value of 3 or less. There may be up to 12 inches of peat on the surface.

Gravel—Rock fragments from 2 mm. to 3 inches in diameter.

Horizon—A layer in the soil approximately parallel to the land surface and differing from adjacent layers in properties such as color, structure, texture, consistence and biological and chemical characteristics.

The main organic horizons are as follows:

L—An organic layer characterized by accumulation of organic matter in which the original structures are definable.

F—An organic layer characterized by accumulation of partly decomposed organic matter. The original structures are discernible with difficulty.

H—An organic layer characterized by accumulation of decomposed organic matter in which the original structures are not definable.

The main mineral horizons are as follows:

A—A mineral horizon or horizons formed at or near the surface in the zone of maximum removal of materials in solution and suspension and/or maximum in situ accumulation of organic matter. It includes horizons in which organic matter has accumulated as a result of biological activity (Ah); horizons that have been eluviated of clay,

iron, aluminum, and/or organic matter (Ae); horizons similar to the above but transitional to the underlying B or C horizon (AB, or A and B); and horizons markedly disturbed by cultivation or pasturing (Ap).

B—A mineral horizon or horizons characterized by one or more of the following: an illuvial enrichment (exclusive of dolomite or salts more soluble in water) of silicate clay, iron, aluminum or organic matter (Bt, Bf, Bh, Bfh); a concentration of weathering products believed to have been formed in situ (Bt); the removal of dolomite and salts more soluble in water (Bm); an oxidation of sesquioxides that gives a conspicuously darker, stronger or redder color than overlying and/or underlying horizons in the same sequum (Bmf); a prismatic or columnar structure characterized by the presence of exchangeable sodium (Bn).

C—A mineral horizon or horizons not appreciably affected by the soil-forming processes indicated in A and B, excepting the process of gleying and the accumulation of dolomite and salts more soluble in water (Ck, Cs, Cg, and C).

The mineral subhorizons described in this report are denoted by the following lower-case suffixes:

c—A horizon cemented by soil-forming processes.

e—A horizon characterized by removal of clay, iron, aluminum or organic matter; usually lighter colored than the layer below.

f—A horizon enriched with hydrated iron.

g—A horizon characterized by reduction and gray colors, often mottled.

h—A horizon enriched with organic matter. When used with A, it must be at least one Munsell unit of value darker than the horizon immediately below.

j—A symbol showing that the property indicated before it is weakly expressed.

k—A horizon enriched with carbonate.

m—A horizon characterized by loss of water-soluble materials only.

p—A layer disturbed by the activities of man; used only with A.

s—A horizon enriched with salt, including gypsum.

t—A horizon enriched with silicate clay.

Humic Gleysol great group—In this group are Gleysolic soils that have an Ah horizon more than 3 inches thick under virgin conditions. When mixed to a depth of 6 inches, this layer (Ap) has more than 3 percent organic matter; on being rubbed or crushed it is darker in color than 3.5 on the Munsell scale when moist (5.0 when dry), and is at least 1.5 units of value (moist) darker than the next underlying horizon (Ae, B or C). There may be up to 12 inches of peat on the surface.

Illuviation—The process of removal of soil material from one horizon to another.

Humic Podzol great group—Soils in this group have thick organic surface horizons (L, F, H), light-colored eluviated horizons (Ae) and illuvial horizons (Bh) in which organic matter is the main accumulation product. The Bh horizon is at least 2 inches thick, has a color of 5YR 3/3 or darker, and contains 10 percent or more of organic matter. It may be underlain by a Bfh or Bf

horizon. A thin (less than 1 inch), wavy, impervious, hard, dark reddish brown hardpan may occur in the solum. The solum is usually moderately to strongly acid.

Mor—Organic matter that rests, with little mixing, on the uppermost mineral or organic-mineral horizon.

Mottles—A variegated pattern of spots and streaks of colors, usually yellows and grays, sometimes blues, indicating poor drainage.

Munsell color notation—A color designation system based on the three simple variables of color: hue, value and chroma. *Hue* is the dominant color, *value* refers to the lightness of color, and *chroma* is the strength of color and increases with decreasing grayness. In writing the Munsell notation, the order is: hue, value, chroma with a space between the hue letter and the succeeding value number, and a virgule between the two numbers for value and chroma, e.g., 5YR 5/6 is a soil with hue 5YR, value 5, and chroma 6. It is called yellowish red.

Orthic Humic Podzol subgroup—In this subgroup are Humic Podzol soils in which free iron is present in the Bh horizon. This horizon is underlain by a Bfh or Bf horizon containing less than 10 percent organic matter. The solum has no hardpan.

Orthic Podzol subgroup—In this subgroup are Podzol soils that have an Ae horizon more than 1 inch thick and a friable Bfh or Bf horizon of high chroma. The lower B horizon may be mottled, especially if it is underlain by a fragipan.

Ortstein—A B horizon that is irreversibly cemented with iron and humus.

Ortstein Podzol subgroup—In this group are Podzol soils that have a cemented Bfh or Bf horizon of high chroma. The cemented horizon may be discontinuous, usually underlies the Ae horizon but may underlie a friable B horizon.

Parent Material—The unaltered or practically unaltered mineral material from which the solum develops.

Peat—Unconsolidated soil material consisting largely of undecomposed or partly decomposed organic matter accumulated under conditions of excessive moisture.

Ped—A soil aggregate.

Percolation—Downward movement or flow of water through the soil when it is saturated.

Permeability—The ease with which air, water, or plant roots penetrate into or through the soil to all parts of the profile. Classes of permeability are: slow, moderate and rapid.

pH—The intensity of acidity or alkalinity expressed as the logarithm of the reciprocal of the hydrogen-ion concentration. With this notation, pH 7 is neutral; lower values indicate acidity, higher values alkalinity.

The classes of acidity are as follows:

Slightly acid	pH 6.1 to 6.5
Medium acid	5.6 to 6.0
Strongly acid	5.1 to 5.5
Very strongly acid	4.5 to 5.0
Extremely acid	below 4.5

Podzol great group—In this great group are Podzolic soils that have a Bfh or Bf horizon in which organic matter and sesquioxides are the main accumulation products. The B horizon contains less than 10 percent organic matter, but the Ae horizon may be underlain by a Bh horizon less than 2 inches thick and containing at least 10 percent organic matter. The solum is usually moderately to strongly acid. In cultivated soils, remnants of the Bfh or the Bf horizon are clearly visible, but remnants of the Ae may not be.

Podzolization—The process by which, under good or imperfect drainage, forested soils develop light-colored eluviated (Ae) horizons and illuvial (B) horizons with accumulations of sesquioxides, organic matter, clay, or any combination of these.

Profile—A vertical section of a soil through all its horizons and extending into the parent material.

Rego Gleysol subgroup—In this subgroup are Gleysol soils with an Ah or Ap horizon that grades into dull-colored, gleyed parent material. There may be up to 6 inches of peat on the surface.

Rego Humic Gleysol subgroup—In this subgroup are Humic Gleysol soils with an Ah or Ap horizon that grades into dull-colored, gleyed parent material. There may be up to 6 inches of peat on the surface.

Regosolic order—in this order are well and imperfectly drained soils that have no discernible horizon above the parent material, or have only an organic-mineral surface horizon (Ah) or organic surface horizons (L-H) less than 12 inches thick.

Regosol great group—All Regosolic soils are in this great group.

Relief—The elevations or inequalities of the land surface when considered collectively.

Rooting zone—That portion of the soil in which roots grow. Root growth may be prevented by an impermeable horizon, a free water table or a coarse-textured, droughty horizon.

Soil series—A group of soils formed from the same parent material and having horizons similar in characteristics and arrangement except for the texture of the surface soil.

Solum—The part of the soil profile above the C horizon, or the A and B horizons.

Structure—The arrangement of primary soil particles or aggregates, the aggregates being separated by surfaces of weakness. There are four main types of structure: structureless, plate-like, prism-like and block-like. These may be subdivided into kinds of structure based on the arrangement of the faces and edges of the aggregates. The following kinds of structure are mentioned in this report:

Blocky—Having block-like aggregates with sharp, angular corners.

Granular—Having more or less rounded aggregates, with no smooth faces or edges.

Single-grained—In individual, noncoherent particles.

Massive—In a cohesive mass, with no observable aggregation of particles.

Platy—In thin, horizontal plates; the horizontal axis is longer than the vertical one.

The *class* of structure depends on the size of the aggregates and may range from very fine to very coarse. The degree of development or *grade* of structure is defined as weak, moderate or strong.

Subsoil—The part of the soil below the plow layer.

Textural Podzol subgroup—In this subgroup are Podzol soils that have a Bft horizon, the accumulations being organic matter, sesquioxides and clay. The organic matter and free sesquioxides decrease rapidly with depth. The clay content increases appreciably from the Ae to the Bft horizon, increases slightly in the Bt2 and Bt3 horizon and is about as high in the C horizon as in the Bt2 or Bt3 horizon. The solum is acid.

Texture—The percentages of sand, silt and clay in a soil determine its texture. Particles from 2 to .05 mm. in diameter are called sand, those from .05 to .002 mm. are called silt and those below .002 mm. are called clay. The ranges of each in the various textural classes are shown in Figure 21. In the figure the abbreviations used for the classes are: C, clay; SiC, silty clay; SC, sandy clay; SiCL, silty clay loam; CL, clay loam; SCL, sandy clay loam; Si, silt; SiL, silt loam: L, loam; SL, sandy loam; LS, loamy sand; S, sand. Sands are coarse-textured, loams are medium-textured and clays are fine-textured.

Till—Glacial drift deposited by the ice with little or no transportation by water. It is usually an unstratified, unconsolidated, heterogeneous mixture of clay, silt, sand and gravel, and sometimes boulders.

Varves—A succession of thin layers of material, usually coarse grained at the base and fine grained at the top. They are usually found in glacial lake deposits.

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